County of Mariposa

Engineering Report

Yosemite West Water Service Area
June 8, 2020

DATE SIGNED: 6/8/2020

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County of Mariposa
Yosemite West Water Service Area

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Abbreviations

ADD.....Average Day Demand
DDW..... (State Water Recourse Control Board) Division of Drinking Water
NB ..... NatureBridge
NPS .....National Park Service
NESC.....National Environmental Science Center
SRWCB.....State Water Recourse Control Board
YWWSA.....Yosemite West Water Supply Area
gpm.....gallons per minute
gpd.....gallons per day
gpcpd.....gallons per capita per day

1 Introduction

This engineering report is prepared pursuant to an Agreement between the County of Mariposa and Provost & Pritchard Consulting Group to provide a technical report for the Yosemite West Water Service Area (YWWSA). The focus of this report is to provide an engineering evaluation of the YWWSA with respect to a recent application by the National Park Service (NPS) requesting a new water service for the NatureBridge National Environmental Science Education (NESC) Campus at Henness Ridge. A vicinity map illustrating the locations of the YWWSA and the NESC campus is provided as Figure 1-1.

The NESC campus was to have obtained water service from the National Park Service's proposed Chinquapin Water System. This small water system was constructed in 2011 to supply potable domestic water to the existing buildings at the Chinquapin intersection plus the NESC campus located approximately one-half mile south along Wawona Road at the intersection with Henness Ridge Road. The water system supplied non-potable construction water to support the initial construction at the NESC campus. However, during the five-year drought period of 2012-2016, well production declined to the point where it no longer is an effective water source. As a result of the loss of this supply, the NPS has been unable to operate the water system or complete the necessary permitting with the State Water Resource Control Board, Division of Drinking Water.

NPS has submitted a Utility Services Connection Application to the County of Mariposa to obtain a water service from the YWWSA specifically for the NESC campus. The County has requested that Provost & Pritchard provide this technical report to evaluate the anticipated water supply demands of the NESC campus and determine impacts of this potential new water service on the existing YWWSA. This report analyzes the existing components of the YWWSA and evaluates the ability of the YWWSA water system to serve the existing system demands plus the impact of an additional demand from a potential water service to the NPS. The report summarizes findings of the evaluation and provides recommendations for the County of Mariposa to consider with respect to the NPS application.

An exhibit map illustrating the existing YWWSA and Chinquapin Water Systems is provided as Figure 1-2.

Figure 1-1: YW Vicinity Map

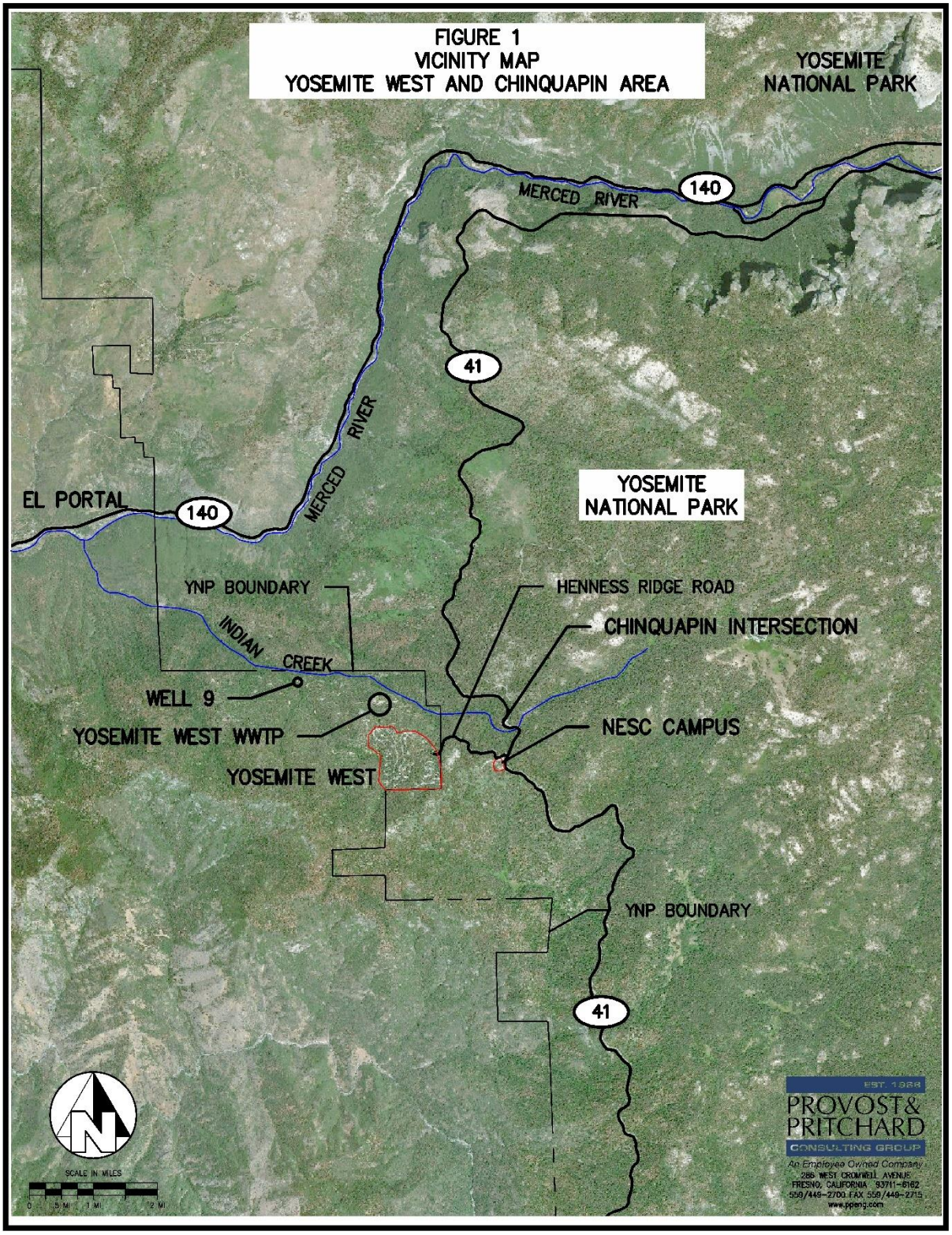
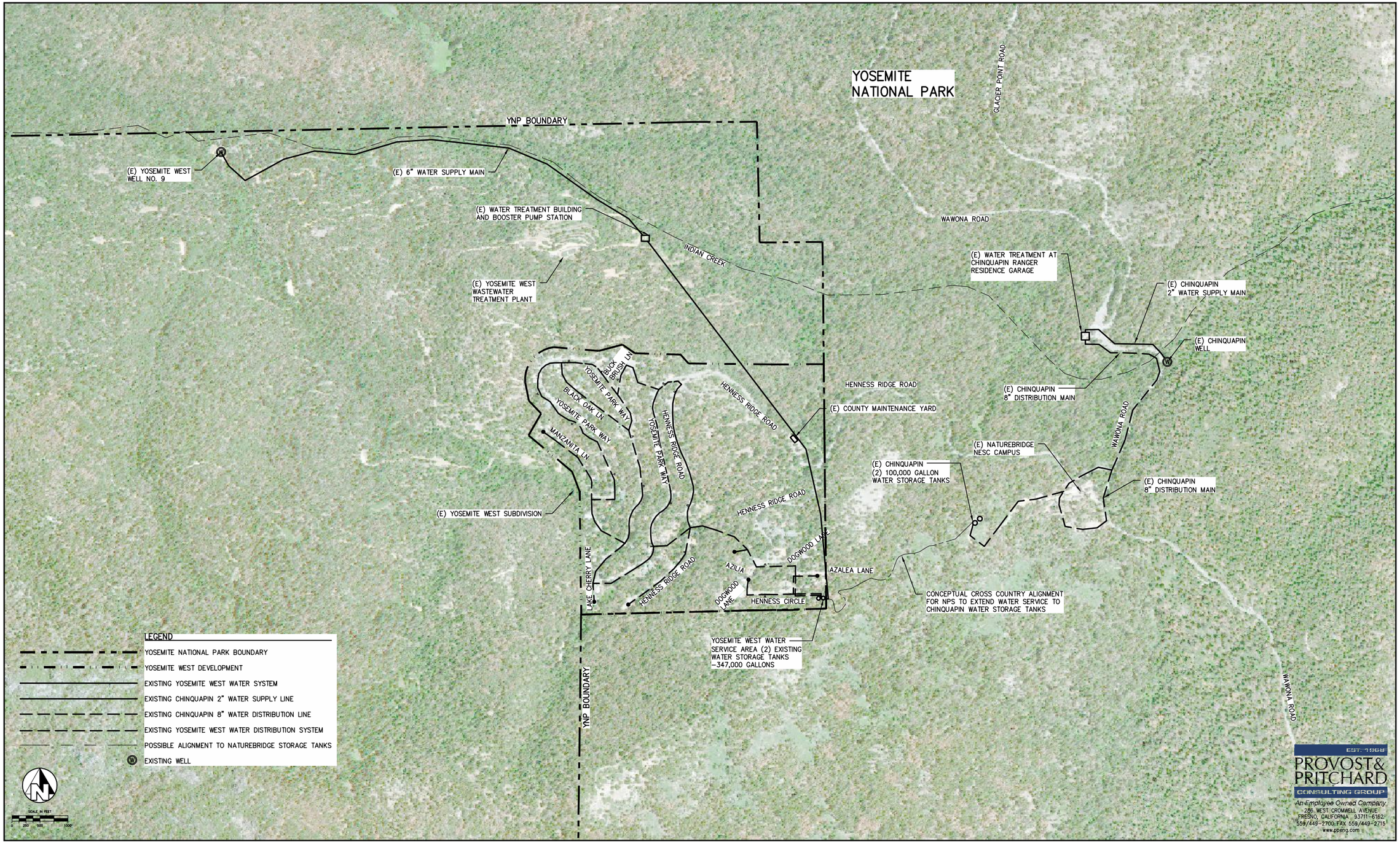


FIGURE 1-2
EXHIBIT MAP OF YOSEMITE WEST SERVICE AREA
AND NPS CHINQUAPIN WATER SYSTEM



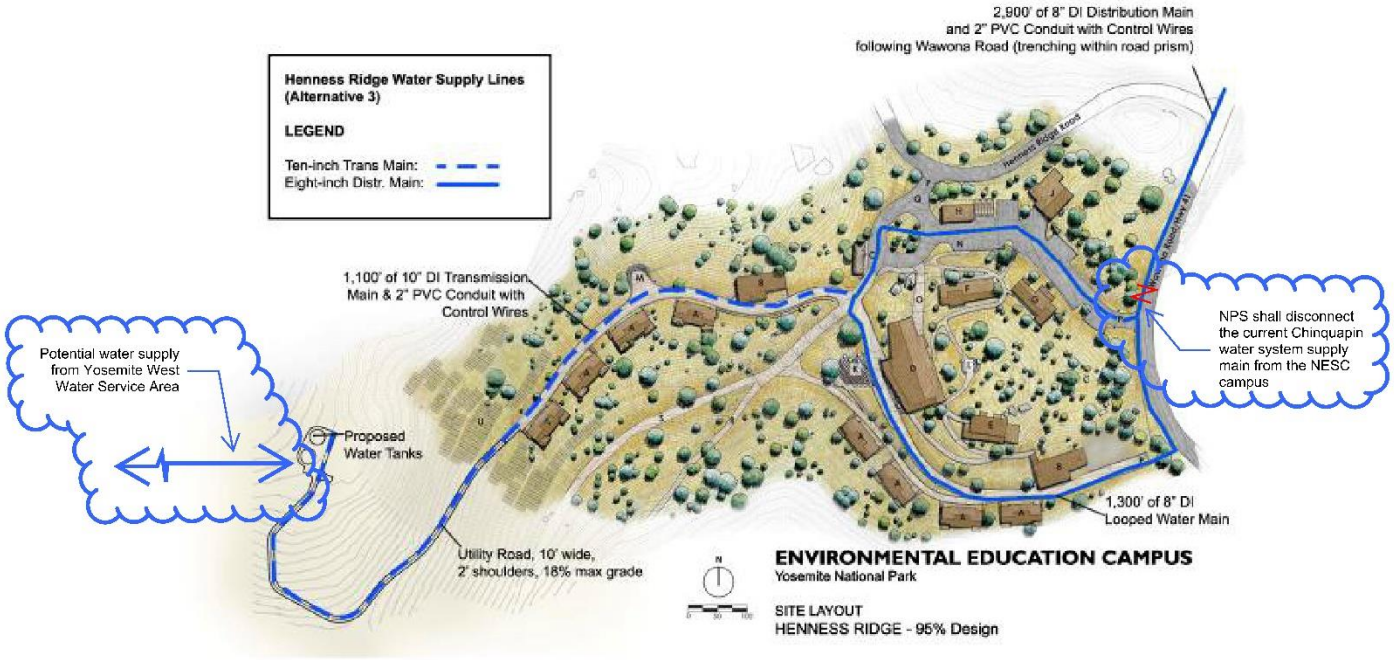
2 Review of Background Information

2.1 National Park Service's Utility Service Connection Application

As previously mentioned, NPS has filed an application with the County of Mariposa to obtain a new water service from the YWWSA to serve the NESC. The application was submitted on August 26, 2019. A copy of the application is located in Appendix A. The application requests a dedicated metered water service to serve the NESC campus. Through additional interviews with the NPS staff, it is understood that NPS plans to segregate the portion of the Chinquapin Water distribution system through the NESC campus, including the two 100,000-gallon water storage tanks from the balance of the Chinquapin water system, to allow the new water service to solely serve the NESC. Figure 2-1 illustrates the concept of how the NESC campus would be disconnected from the Chinquapin Water System.

Separately from the application to the County of Mariposa, NPS will pursue an alternative water supply for the balance of the Chinquapin Water System, including the Chinquapin Comfort Station and Ranger Residence. This application is limited to a request for a water service. The NESC has a dedicated on-site wastewater treatment and disposal system and will to use this system as originally designed to treat and dispose of all campus wastewater.

Figure 2-1: NESC Segregate from Chinquapin Water System



Base map for this Exhibit taken from:

Yosemite Environmental Education Center
Final Environmental Impact Statement

2.2 Background of National Park Service's Chinquapin Water System

The National Park Service constructed the Chinquapin Water System in 2011 to supply potable domestic water to the Chinquapin area of Yosemite National Park. The water system serves two NPS buildings; a Ranger Residence and the Chinquapin Comfort Station at this Chinquapin intersection, plus the NESC Campus located one-half mile south along Wawona Road at the intersection with Henness Ridge Road. The individual components of the water system are described in greater later detail below. The system is generally comprised of a single hard rock well, a 2-inch supply main to a water treatment room for chlorine disinfection, an 8-inch distribution pipeline to supply water to the Chinquapin Ranger Residence and Comfort Station, the NESC campus and two (2) 100,000 gallon water storage tanks located above the NESC. The hard rock well initially produced 28 gallons per minute during 10-day well development pump testing in 2006. The well was improved with a submersible pump capable of pumping 28 gpm as part of the Chinquapin Water System construction in 2011. The water system supplied non-potable construction water to support the initial construction at the NESC campus. However, during the five-year drought period of 2012-2016, well production significantly declined to the point where it no longer is an effective water source.

2.3 Background of National Environmental Science Center Campus development

NatureBridge is the largest non-profit education partner of the NPS. Formerly known as Yosemite Institute, NatureBridge has provided week-long residential environmental education programs for youth in Yosemite National Park since 1971. Working under a Cooperative Agreement, NatureBridge provides educational programming to over 13,000 participants annually in Yosemite, operating out of concession-run facilities in Yosemite Valley and a small, rustic NPS facility at Crane Flat. Since 1973, NatureBridge has used the undersized Crane Flat facility, which consists of older buildings from the Civilian Conservation Corps era, not originally designed for education purposes. Many of these buildings are deteriorating and need extensive repairs. The Crane Flat facilities are inefficient and poorly adapted for conserving water and energy, minimizing light and sound impacts, and protecting surrounding resources. While the NPS and NatureBridge initially considered upgrading and expanding the Crane Flat facility to accommodate additional students, natural resources and other concerns led the NPS and NatureBridge to consider alternative locations for a replacement center within the park. The creation of a permanent center devoted to youth in Yosemite underscores the NPS's commitment to education and its mission of inspiring future generations of park stewards.

A Record of Decision on the Yosemite Environmental Education Center Final Environmental Impact Statement was finalized on April 5, 2010. NPS evaluated eleven potential sites--including an expanded facility at Crane Flat and ultimately decided to locate a new fully sustainable educational facility at Henness Ridge. NatureBridge is financing the design and construction of the campus, now known as the National Environmental Science Center (NESC), with private fundraising efforts. When completed, the facility will be a 224-bed Net Zero Energy campus built to a LEED Platinum standard, the highest level of sustainable building design incorporating passive ventilation design, water conservation features, greywater recycling, photovoltaic energy production, bio-gas harvesting, and a geothermal heat pump system. The Crane Flat facility will continue to operate until the Henness Ridge center is constructed and operable, at which time the NPS will demolish the buildings at Crane Flat and restore the area to natural conditions.

In 2011, concurrent with the NPS construction of the Chinquapin Water System, NatureBridge broke ground on the NESC campus construction with underground site utility improvements. Since then, construction at the NESC has continued with phased development of the campus, with the first 56-bed phase completed in 2018.

The facility currently consists of a maintenance building; administration building with a temporary commercial kitchen (to serve as an interim dining hall); three staff cabins; two student cabins, each with a capacity for 28 beds; and a bathhouse. The ultimate campus build-out will include an additional six student cabins, another bathhouse, a 112-person capacity dining hall with commercial kitchen, a classroom building, a fourth staff cabin, amphitheater, arrival shelter, and an on-site NPS fire station. The current capacity for Phase 1 of the campus is 56 students (28 students per cabin) and three on-site staff (one per cabin). The build-out capacity will be 224 students, four on-site staff, and temporary quarters for 16 staff (to be used in emergencies or in severe weather).

Due to the reduced water supply for the Chinquapin Water System, the NPS has been unable to permit the water system with the SWRCB DDW. Consequently, NatureBridge has not been able to open the NESC campus to students.

2.4 Background of Yosemite West Water Service Area

The Yosemite West subdivision is a private residential development of single-family dwellings and a 50-unit condominium complex on private property within Mariposa County located immediately outside the boundary of Yosemite National Park. Access to the subdivision is provided through Henness Ridge Road from Wawona Road in Yosemite National Park. The Park boundary is located approximately one-quarter mile west of Wawona Road.

The original tract map of Yosemite West Subdivision consisting of 294 lots was recorded in 1967. The original subdivision infrastructure improvement included water and sewer systems plus roadway improvements throughout the subdivision.

2.4.1 DDW Letters Issued to Mariposa County

It is understood that the County of Mariposa has notified the State Water Resources Control Board, Division of Drinking Water (DDW) of the Utility Service Connection Application filed by the NPS for a new water service for the NESC campus. DDW provided a letter dated September 9, 2019 from Ms. Kassie Chauhan, Senior Sanitary Engineer of the Merced District, which summarized DDW's recently completed Sanitary Survey Report. In the letter, in addition to transmitting the Sanitary Survey Report, DDW takes the opportunity to provide advisory comments related to NPS for a new water service for the NESC campus. A summary of the key points of this letter are outlined below.

1) DDW confirms their regulatory jurisdiction over the Yosemite West Water System (Permit No. 2210924).
2) DDW authority includes ensuring system is providing adequate quantity of water meeting all primary and secondary drinking water quality standards.
3) DDW provides clarification of regulations pertaining to existing water systems.
4) DDW notes that their recent Sanitary Survey Report was completed in September 2019. The report includes an evaluation of existing source capacity for the Yosemite West Water System. DDW summarizes a simplified evaluation of water system's peak hour demand versus source capacity.
    a. DDW reviewed water system production records and considered a maximum July month where 1,535,000 gallons were produced, equating to 36 gpm as an Average Day Demand over the month. The Maximum Day Demand was determined by applying a 1.5 peaking factor for an estimated flowrate of 54 gpm. Further, the Peak Hour Demand was estimated by applying

an additional 1.5 peaking factor on top of the Maximum Day Demand for an estimated flowrate of 81 gpm. The evaluation concludes that the existing water source has adequate capacity at 85 gpm to supply the maximum month's Average Day Demand, Maximum Day Demand and Peak Hour Demand. The letter also acknowledges the available 347,000 gallons of water storage, which further increases the overall source capacity.

b. The letter notes that the DDW has the authority to require a source capacity planning study if they determine there is a problem with water supply or a proposed expansion of the service area by more than 20 percent. Based on DDW's recently completed source capacity evaluation, they determined that source a capacity planning study is not required at this time.

5) DDW reiterates their previously expressed concern over the single source of water supply. The County previously mitigated this concern by establishing an agreement with a neighboring property owner whereby an emergency water connection may be provided by installing a water line from the neighbor's supply well to the YWWSA water storage tanks. DDW previously accepted this arrangement.

6) DDW considered that the NESC campus infrastructure includes 200,000 gallons of water storage. The letter suggests that in exchange for water service, the water storage tanks above NESC be linked to the Yosemite West system, thus increasing effective water source capacity of the YWWSA system.

7) DDW notes that the Chinquapin water system does not have a water supply permit. Under the guidelines of Senate Bill 1263, when such an application is submitted, the application would require evaluation of the potential for consolidation with existing public water systems within three miles. DDW attempts to prevent formation of new public water systems when consolidation with existing systems is feasible. Under this policy, DDW encourages and supports discussions between NPS and County of Mariposa regarding the application for service for the NESC campus. DDW states their preference for NPS to obtain a new water service for NESC from YWWSA rather than forming a new water system.

8) DDW refers to the potential NESC water services connection together with increasing source capacity (storage capacity) through interconnected water storage tanks as a "Golden Opportunity." DDW determines that YWWSA can support the additional water demands of the NESC campus.

9) DDW notes that a permit amendment would not be necessary for the NPS connection. However, if the 200,000 gallons of water storage is added to the YWWSA, a permit amendment would be required which would include review of record plans and field inspection.

A second letter from Ms. Chauhan, dated September 19, 2019, was provided to the County of Mariposa. This letter appears to respond to additional questions posed to DDW regarding the potential impacts on the Yosemite West Water System from a potential water service to NPS for the NatureBridge Campus. The letter addresses a specific concern regarding the ability of the water source to meet future water demands at full build-out of the Yosemite West subdivision, should a water service be provided to NPS at this time. The letter describes 172 current water services and 122 stand-by connections for undeveloped lots. A summary of the key points of this letter are outlined below.

1) DDW estimates the future maximum day demand of Yosemite West at full build-out by projecting the current Maximum Day Demand on a per-service connection basis to the full build-out of 294 units. The projections estimate a future Maximum Day Demand of 92 gpm, which exceeds the current source capacity of 85 gpm.

2) DDW suggests that future expansion of source capacity will become necessary. The letter identifies the historical slow pace of development, which was identified as an average of four homes built per year. Letter implies that it could be 24 years until there are 270 service. (DDW estimates that at 270 services, the Maximum Day Demand is projected to meet current well source capacity => 0.314 gpm/connection x 270 connections = 85 gpm).

3) The letter further forecasts the estimated demands for the NESC campus in addition to existing YWWSA demand at 59.1 gpm. DDW suggests an additional 25.9 gpm would be available for future Yosemite West development, equating to 82 additional connections. At current building patterns, this is estimated to be sufficient to provide for 20.5 years of building.

The evaluation presented in the DDW letters use a simplified approach and are appropriate for the level of detail retained in DDW's water system permitting records. However, their assessment does not adequately evaluate the operation of the water system where abundant water storage is available to meet Maximum Day and Peak Hour demands. The well source capacity is available to replenish the water storage tanks at a flow rate that exceeds the Average Daily Demand. This more precise level of evaluation is presented in Section 3 of this report.

The DDW letters outlined above are included for reference in Appendix B.

2.5 Existing System Components

2.5.1 NPS Chinquapin Water System

The Chinquapin Water System was briefly described in the Introduction section. Below is a description of the water system. A graphical illustration of the water system including its proximity to the YWWSA is provided in Figure 2.

- Water Source: The Chinquapin well is located on the east side of Wawona Road (Highway 41) adjacent to Indian Creek, approximately 1,000 feet southeasterly from the roadway intersection of Wawona Road and Glacier Point Road. The well was drilled in 2006 to a depth of 1,007 feet, through granitic rock. Six zones of fractured rock are identified on the well log, however only the lower two zones from 718 to 719 feet and 884 to 885 feet produced water. A report by Kenneth D. Schmidt and Associates was prepared in December 2006 to summarize the 10-day well development pump testing that was conducted. The pump testing determined a sustainable well capacity of 28 gpm. The submersible pump was designed to meet this pumping capacity with a total dynamic head of 1,135 feet in order to lift water from well, through the distribution system and fill the water storage tanks.

- Supply Main and Water Treatment: Approximately 1,000 feet of 2-inch HDPE water main is installed under Wawona Road from the well site to the garage behind Chinquapin Ranger Residence. A new treatment room was constructed within a portion of the garage as a water treatment room. The water treatment consists of an above-grade 3-inch ductile iron plumbing tree to allow for injection of hypochlorite solution for water disinfection and metering before discharge to the 8-inch distribution main.

- Distribution Main and Water Storage Tanks: From the Chinquapin garage, an 8-inch HDPE water distribution main is installed under Wawona Road to the NESC campus. At the campus, the distribution main branches into an 8-inch water main loop through the NESC campus to serve the various buildings and fire hydrants. At the southwestern portion of the loop, an 8-inch main branches from the loop and heads uphill to two side by side 100,000-gallon bolted steel water storage tanks at a ground elevation of 6240. The distribution mains were sized at 8-inch in order to minimize friction loses under normal demand and convey fire flows to the NESC campus and the fire hydrant at the Chinquapin intersection in front of the Ranger Residence.

- A Supervisory Control and Data Acquisition (SCADA) system was installed with the water system. The primary control occurs at the water treatment room in the Chinquapin garage for well pump

operation and water treatment metering pumps for disinfection. A remote telemetry unit at the wellhead transmits signal for well head pressure and pump operation and receives signals for pump start and stop. A second remote telemetry unit at the NESC transmit signal regarding water system pressure and water storage tank level.

2.5.2 Yosemite West Water System

The Yosemite West Water system was originally constructed in the 1960's to support the Yosemite West Subdivision. Below is a description of the current water system:

- Water Source: Well No. 9 is the sole source of water supply for the YWWSA. The well is located nearly 2.5 miles from the Yosemite Park Way cul de sac where a dirt access road traverses down the hill 0.9 miles to the Yosemite West Wastewater Treatment Plant and adjacent water treatment building and booster pump station site. The dirt access road continues another 1.6 miles further downhill to the well site near the confluence of the West Creek and Indian Creek. Well No. 9 was drilled in September 1980 to a depth of 325 feet, through 78 feet of weathered granitic rock and the remining portion through fractured granitic rock. Fractured zones at depths of 101 feet and 130-132 feet produce most of the water in the well. Well drilling notes summarized by Ken Schmidt indicate that at the time of well drilling, the fracture at the 101-foot depth produced about 70 gpm and the fractured zone between 130-132-foot depth produced another 30 gpm. Small amounts of water were produced at depths of 190-200 and 300 to 305.

  A report by Kenneth D. Schmidt and Associates was prepared in November 1984 entitled "Results of October 1984 Pump Tests at Yosemite West". This report summarized pump testing of three separate wells (Well No. 11, Well No. 9, and Well C), which are all located within 300 feet of each other in the vicinity of the confluence of West Creek and Indian Creek. Dr. Schmidt's Pump Test report is based on his previous recommendation that all three wells be pumped simultaneously to determine each well's respective long-term yield.

  The 12-day pump test for Well No. 9 was conducted between October 3rd and October 15th. The well was pumped at an average rate of 105 gpm and produced a total of 1,806,500 gallons during the test. The results of the well development test for Well No. 9 determined a sustainable well capacity of 87 gpm for a projected 100-day continuous pumping timeframe. The development pump tests for Well No. 11 and Well C had much lower pumping rates, in the range of 16-18 gpm. Neither of these wells are active today.

  Well No. 9 continues to produce water in accordance with the initial well development test and yield determination completed in 1984. According to County Public Works operators, the well pump continues to produce approximately 85 gpm with the submersible pump currently installed. The County staff manually measure the static water level in the well once or twice a year as time, weather, and access to the well allow. A review of records provided by the County over the last five years show consistent data for measurements of static water level of 41 to 50-foot depth and pumping water level of 75 to 85 foot depth, reflecting a drawdown of approximately 35 feet.

- Water Supply Main and Treatment: Well No. 9 is located at an approximate elevation of 4,620. The submersible well pump supplies sufficient pressure to convey the water uphill approximately 580 ft to a 2,000-gallon water storage tank located inside the water treatment building. Inside the building, the water is processed through the Lowry package aeration system followed by chlorine disinfection. A duplex multi-stage booster pump system pressurizes the discharge water to 450 psi in order to push

the water up an additional 1,000 feet to the dual steel water storage tanks at an approximate elevation of 6,200.

- Distribution Main and Water Storage Tanks: The YWWSA has two, side by side, water storage tanks. One is bolted steel and the other is welded steel. The tanks have underground interconnection piping and a combined storage capacity of 347,000 gallons. These two tanks provide fire water storage for Yosemite West and supply water to the YWWSA distribution system. In accordance with Mariposa County Fires Standards, a minimum volume of 180,000 gallons must be reserved in the water storage tanks at all times for emergency fire water. The elevated location of the water storage tanks provides sufficient water pressure for a majority of the YWWSA. A booster pump and hydro-pneumatic tank pressurize water from the distribution main in order to provide adequate water pressure to a small portion of subdivision lots along Hennes Ridge Circle which are located close to the water storage tanks.

3 Yosemite West Water System Evaluation

The engineering evaluation will review historical water production data from the County of Mariposa and consider the potential for additional water demand associated with a new water service to NPS for the benefit of NESC campus. The evaluation will include review the Well No. 9 water source, the pressurized conveyance pipeline to a water treatment building and booster pump station which further pressurizes the water supply to elevated, at-grade steel water storage tanks and the existing water distribution system.

At the request of Provost & Pritchard, the County of Mariposa provided five years of historical pumping data for Well No. 9. The County's data is based on monthly meter readings at the well. For the purpose of this evaluation, the data has been complied into monthly average demands. This data is included is Appendix C. Further, the monthly average demands were reduced to Average Daily Demands by dividing the monthly meter reading by the calendar days of the preceding month.

Below is a list of assumptions that will guide the evaluation based on review of record plans and discussion with County operations staff.

1) County of Mariposa owns and operates a water system and a sanitary sewer collection and treatment and disposal system (wastewater system) for the Yosemite West community. At the time of preparation of this report, these systems only serve the Yosemite West community.
2) The water system is operated under a permit with the California State Water Resources Control Board – Drinking Water Division (Permit No. 2210924).
3) The wastewater treatment plant currently operates under Central Valley Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDR) Order No. 99-004. The permitted capacity of the existing WWTP is 60,000 gallons per day (gpd). In discussion with County operations staff, it is understood that during the spring months the plant experiences a significant increase in flow. During the wet weather spring months, the plant occasionally experiences daily peak flows in excess of the 60,000 gpd permit threshold. While this report evaluates the potential water demand for a new water service connection to the YWWSA, it is understood that the limited capacity of the wastewater system is a primary focus of the Public Works Director when considering issuance of additional building permits in the Yosemite West Subdivision.
4) The current NPS application for service is limited to a domestic water service connection. The campus has an on-site wastewater treatment and disposal system.
5) The evaluation does not consider a merger of the Yosemite West and Chinquapin water systems.
6) P&P engineers conducted a field review with Mariposa County Public Works Operations staff in February 2020. Through review of existing conditions and discussions with the Public Works Operations staff it appears that the best location for a potential new water service to serve NPS is a tap from the YWWSA distribution main immediately downstream of the YWWSA water storage tanks. The site is level and accessible. A PG&E transformer is nearby, where power could be obtained for booster pump station.
7) NPS would be required to install a booster pump at water service and meter location in order to pressurize a transmission main to convey the water to the Chinquapin water storage tanks. There are a variety of alignments that NPS may consider for the water transmission main to the Chinquapin water storage tanks. The booster pump and transmission main would be an NPS facility. NPS shall be responsible to obtain the necessary environmental clearance and complete

the necessary engineering, design, and construction of the water service conveyance facilities. YWSSA would only be responsible to provide the water service and meter on County property adjacent to the water storage tanks.

8) The evaluation will consider the average daily demand of the NESC campus as part of the daily storage requirement for the YWWSA. For the purpose of this evaluation, it is assumed that the YWWSA Well No. 9 well pump operates daily to replenish the previous day's drawdown of the water storage tanks.

3.1 Evaluation of Water Demands

3.1.1 Yosemite West Water System Historical Water Demands

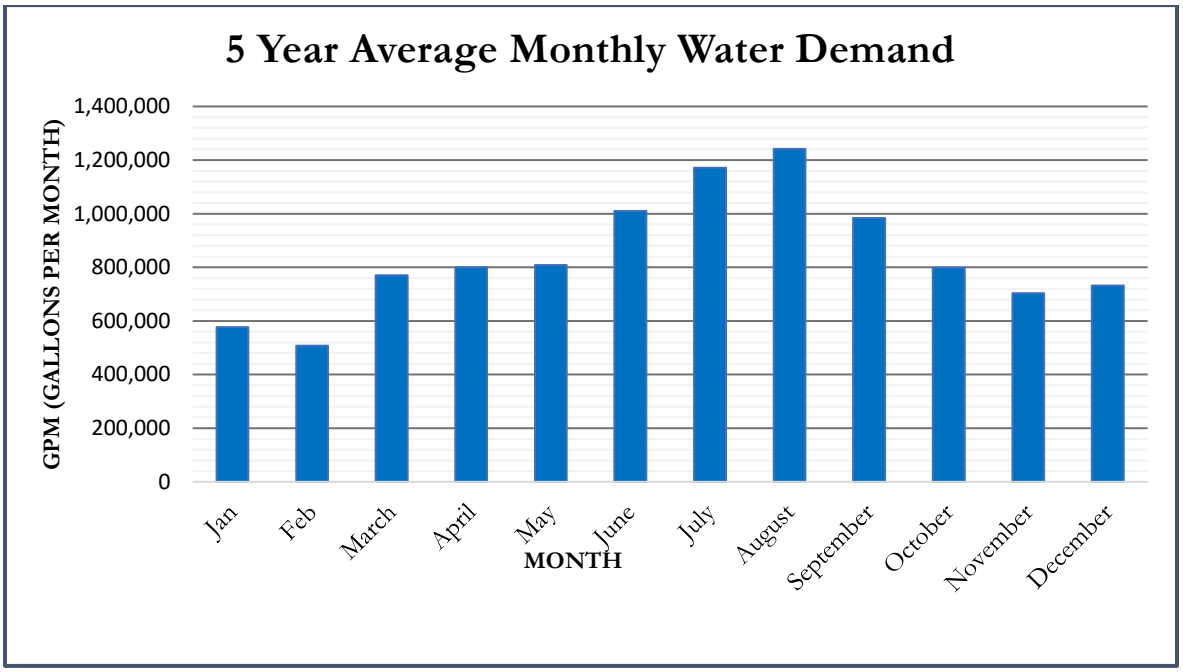
The County monitors and records Well No. 9 meter readings on a monthly basis. Since Well No. 9 is the sole source of water supply, this data represents the total monthly water demand for the YWWSA. At the request of Provost & Pritchard, the County of Mariposa Public Works Department supplied historical Well No. 9 monthly meter reading data for calendar years 2015 through 2019, as reference for this evaluation. The data is included in Appendix A. A summary of the total annual water production the subject years is included in Table 3-1 below.

Table 3-1: Yosemite West Water System, Well No. 9 Summary of Annual Water Production

Year	Annual Production (gallons)
2015	8,954,000
2016	10,039,000
2017	9,874,000
2018	10,105,000
2019	11,670,667

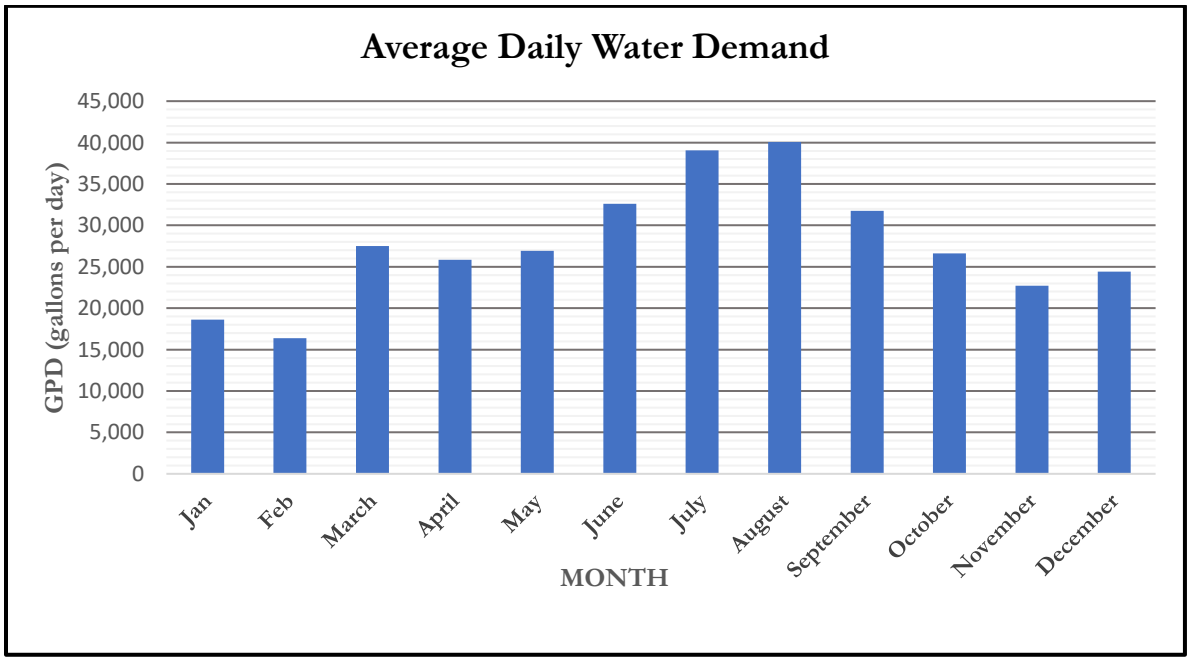
The monthly meter reading data illustrates a peak in the summer months of May through September as would be expected. Figure 3-1 below illustrates a graphical presentation of the 5-year average monthly water demand.

Figure 3-1: Yosemite West Water System



For the purpose of completing an appropriate evaluation of the daily operation of the YWWSA well and water storage tanks, it is necessary to consider the Average Daily Demand. Given the range in water demand on a month-by-month basis illustrated in the Figure 3-1 above, an Average Daily Demand has been calculated based on the 5-year average monthly demands. The Average Daily Demand for each month is illustrated in Figure 3-2.

Figure 3-2: Average Daily Water Demand



3.1.2 National Environmental Science Center Campus

NatureBridge contracted with Provost & Pritchard Consulting Group (P&P) in October 2019 to conduct and engineering evaluation of the NESC campus construction plans and forecast the water demand for the full build-out of the NESC campus. P&P conducted a detailed review of the construction plans, with a focused review of the plumbing plans for each building, the commercial kitchen plumbing plans, equipment plans, and major kitchen equipment product cut sheets.

A Technical Memorandum which summarized the research, calculations and recommendations was prepared. A copy of this Technical Memorandum is included in Appendix D. The calculations forecast an average daily water demand of 20 gallons per capita per day (gpcpd). The recommendation section acknowledges programming and operational assumptions can vary. A factor of safety of 1.5 times the calculated water demand is recommended for planning purposes. This yields an estimated water demand of 30 gpcpd or 7,320 gpd.

This evaluation accepts the recommendation for the factor or safety applied to the calculated water demand. For the purpose of this evaluation, the NESC campus water demand will be rounded up to 7,500 gallons per day.

3.2 YWWSA Water Supply Infrastructure

In the operation of the water system the water is pumped from Well No. 9, through the water supply main to water treatment building and booster pump station then up to the water storage tanks. There are no water services connected to the water supply pipeline between the well and water storage tanks. The County's SCADA system calls for the well pump to operate based on monitored water level elevations in the water storage tanks.

The evaluation considers the water available in the water storage tanks to be the primary water supply on a daily basis. The well is evaluated on the basis of its ability to replenish the water storage tanks.

3.2.1 Well No. 9

3.2.1.1 Water Supply

A detailed description of the YWWSA system components are outlined in Section 2 of this report. In particular, the results of the 12-day well development pump test for Well No.9, which was conducted in October 1984, determined a sustainable well capacity of 87 gpm for a projected 1,00-day continuous pumping timeframe. County Public Works operations staff report that Well No. 9 consistently and reliably produces water at rate of 85 gpm with the current submersible pump installed in the well.

The month of August has historically been the highest water production month for the water system. The 5-year average monthly water demand for August is calculated to be 1,242,000 gallons or approximately 40,000 gpd. Based on data provided by the County, the month of August 2019 was the highest demand month in the 5-year reporting period, with production of 1,456,000 gallons or roughly 47,000 gpd. In consideration of the range of calculated average daily demands of the water system, Table 3-2 below calculates the average daily well pump operation time to replenish the average daily demand of the water system. The calculated daily well pump operation times range from 3.2 to 7.9 hours per day. In the peak month of August 2019, the average

daily well operation time would have been 9.2 hours per day. Based on review of this data, the well is capably replenishing the average daily demand in the water storage tanks.

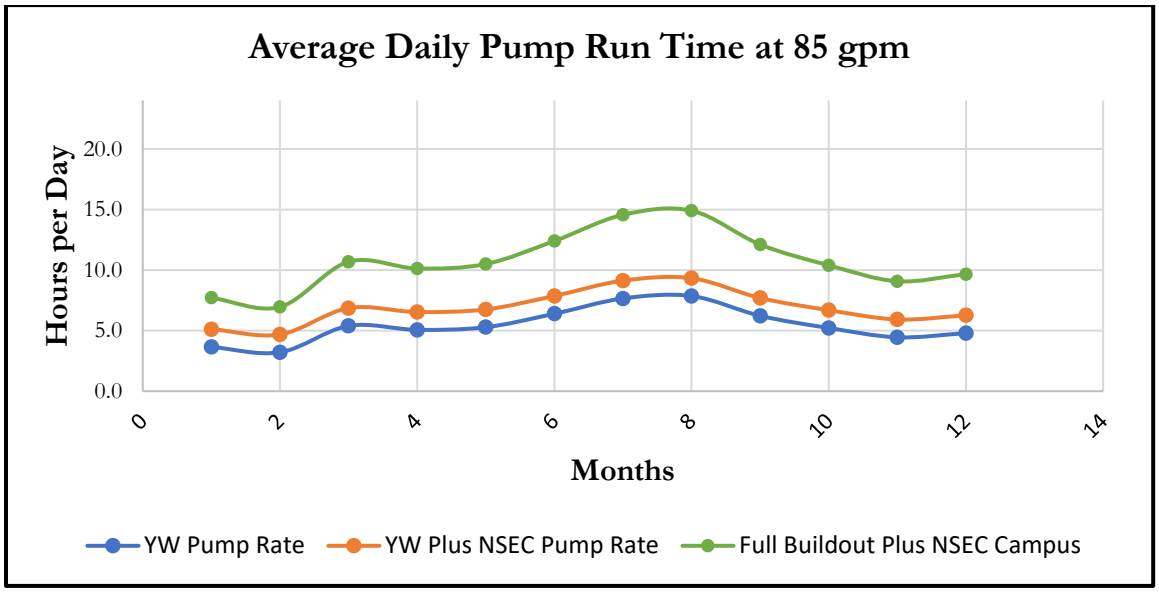
Table 3-2: Yosemite West Water System

Month	Avenue Daily Demand (gallons)	Average Daily Well Pump Operation (Hours)
January	18,619	3.7
February	16,368	3.2
March	27,498	5.4
April	25,831	5.1
May	26,940	5.3
June	32,600	6.4
July	39,053	7.7
August	40,071	7.9
September	31,742	6.2
October	26,627	5.2
November	22,697	4.5
December	24,427	4.8

3.2.1.2 Additional Water Demand for NESC

The estimated water demand for the NESC campus is forecast to be 7,500 gallons per day. Should a new water service be supplied to NPS for the benefit of the NESC campus, this increase in demand will require pumping of Well No. 9 by 1.5 hour per day (7,500 gpd @ 85 gpm) in addition to the current well operation for the Yosemite West water demand. In further consideration of potential build-out of the undeveloped 122 undeveloped lots within Yosemite West, a projection of future demand has been calculated based on the current water demand for the 172 existing service connections. Figure 3-3 below graphically illustrates daily well pumping hours to meet these projected demands. Well No. 9 has the ability to provide the water supply to the water storage tanks to support the additional demand associated with the NESC campus and future build-out of Yosemite West.

Figure 3-3: Average Daily Pump Run Time at 85 gpm



3.2.1.3 Drawdown

The County staff manually measure the static water level in the well at least once in accordance with DDW permit requirements. The measurements are recorded in the month of September when the depth to water level is anticipated to be the lowest of the season. When County staff have time available, they will record a second measurement in the month of October. Yosemite West experiences the highest annual water demand during the summer months. Additionally, the preceding spring and summer months typically lack rain or snowfall which contribute to groundwater replenishment. A summary of these measurements is included in Table 3-3 below. The static and pump running measurements are relatively consistent over the last five-year period. Static water levels range from 41 to 50 foot below ground surface. The water level drops to 75 to 85 foot below ground surface when the pump is running. During the staff interview, it was also noted that the well has been called upon to provide water supply for wildland fire fighting over the last few years, including a 12-day period where the well was pumped 24 hours a day. No problems with well production were noted. The water level measurements at static and pump running conditions suggest the well is operating consistently with the original well development tests and consistently over time. The increase in pumping associated with the new NPS water service for the NESC campus appears to be within the well's production capacity.

Table 3-3: Yosemite West Water System, Well No. 9 Summary of Annual Well Drawdown Measurements

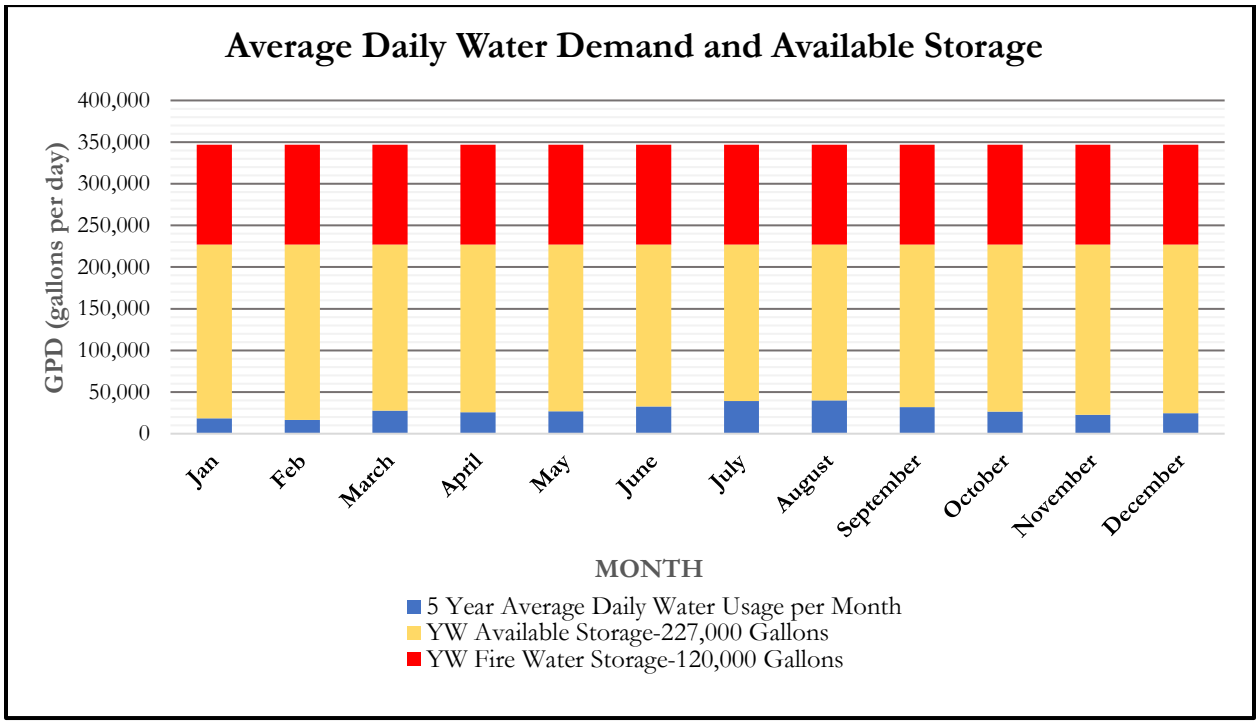
Month/Year	Monthly Meter Reading (gpm)	Static Water Level (depth in feet)	Water Level with Pump Running (depth in feet)	Drawdown during pumping (ft)
October 2019	983,000	41.5	75.3	33.8
September 2019	1,199,000	45.7	77.2	31.5
October 2018	744,000	48.4	78.9	30.5
September 2018	876,000	46.7	80.3	33.6
October 2017	853,000	46.8	No Data	-
September 2017	1,073,000	47.9	85.1	37.2
September 2016	935,000	50.3	78.6	28.3
September 2015	837,000	50.5	No Data	-

3.2.2 YWWSA Water Storage

As mentioned previously, there are two at-grade steel water storage tanks which provide a total of 347,000 gallons of available water storage for fire protection and domestic demand. The County of Mariposa Fire Standards for rural residential communities require 1,000 gpm fire flow for two hours, for a total of 120,000 gallons of fire storage. After accounting for this mandatory fire water storage, which must be held in the tanks at all times, the remaining storage available for domestic water is approximately 227,000 gallons.

Figure 3-4 below graphically represents the Average Daily Demand by month compared to the available storage. Under existing conditions, the water storage tanks have capacity to supply approximately 5-½ days of Average Daily Demand in the August and roughly 14 days in February.

Figure 3-4: Yosemite West Water System Average Daily Demand Versus Available Water Storage

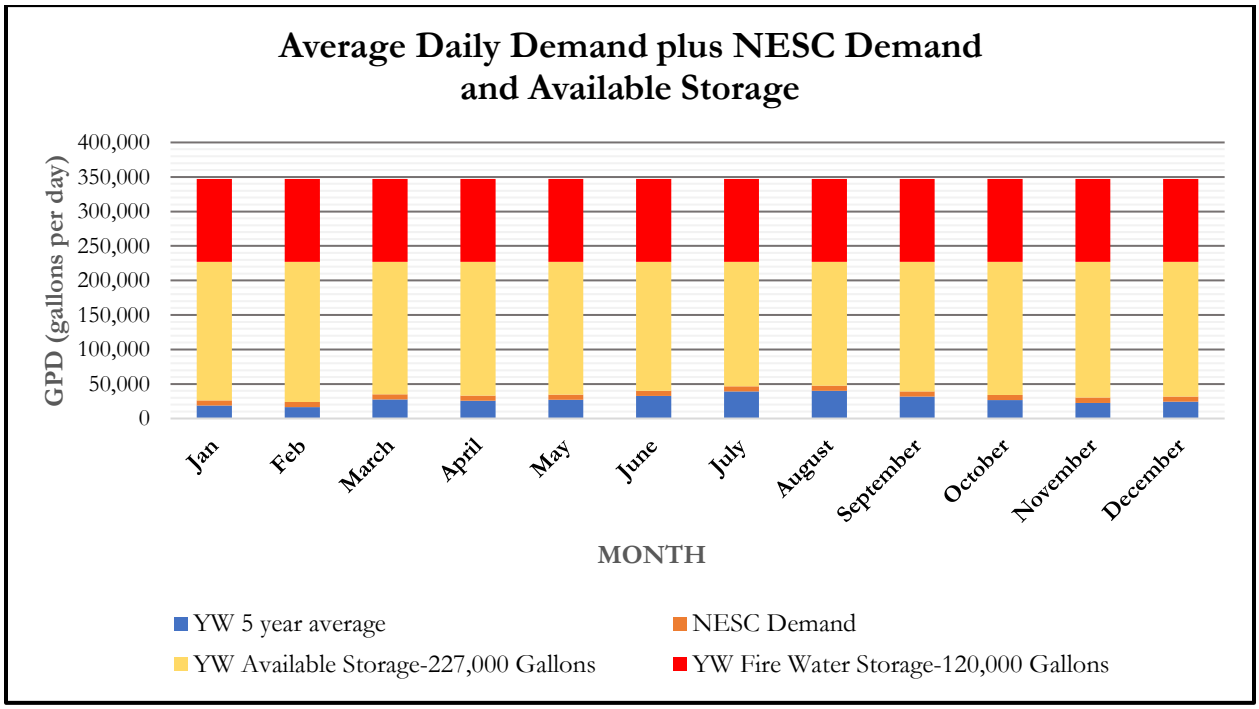


3.2.2.1 Additional Water Storage Requirements for NESC Average Daily Demand

The additional 7,500 gallons per day of water demand for the NESC would be pumped to the YWWSA storage tanks, upstream of the NPS booster pump station that will convey water to the Chinquapin water storage tanks. Therefore, the impact to this Average Daily Demand should be considered with respect to the available storage for YWWSA service connections.

Figure 3-5 below illustrates the impact of the Yosemite West 5-year Average Daily Demand by month plus the NESC Average Daily Demand relative to available storage. The Figure illustrates the relationship to available storage to the 5-year Average Daily Demand. The Figure illustrates a storage capacity of approximately 4.5 days based on the maximum month demand.

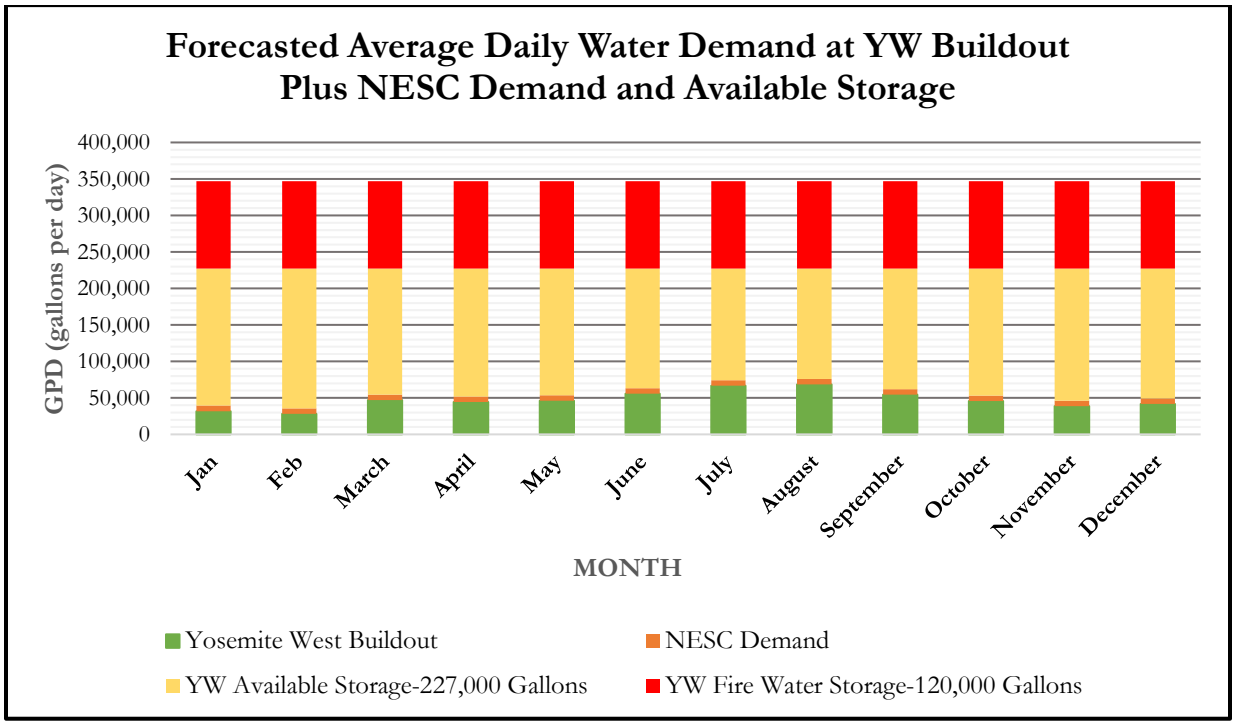
Figure 3-5: Average Daily Demand Plus NESC Demand and Available Storage



In further consideration of water storage available for the potential build-out of the 122 stand-by lots, a projection of future Average Daily Demand together with the NESC campus demand has been forecasted. Figure 3-6: Forecasted Average Daily Water Demand at YW Buildout
below graphically illustrates projected future average daily demand and available storage in the tanks. The data projects that during the highest use month, there would be approximately three days of water available in storage.

This evaluation also recognizes that the Chinquapin water storage tanks will provide fire flow water storage plus operational storage capacity for a 10-day supply for the NESC campus. In the event of a service interruption at YWWSA due to an emergency or planned repair, the NESC could operate for up to 10 days independently from the YWWSA water service.

Figure 3-6: Forecasted Average Daily Water Demand at YW Buildout

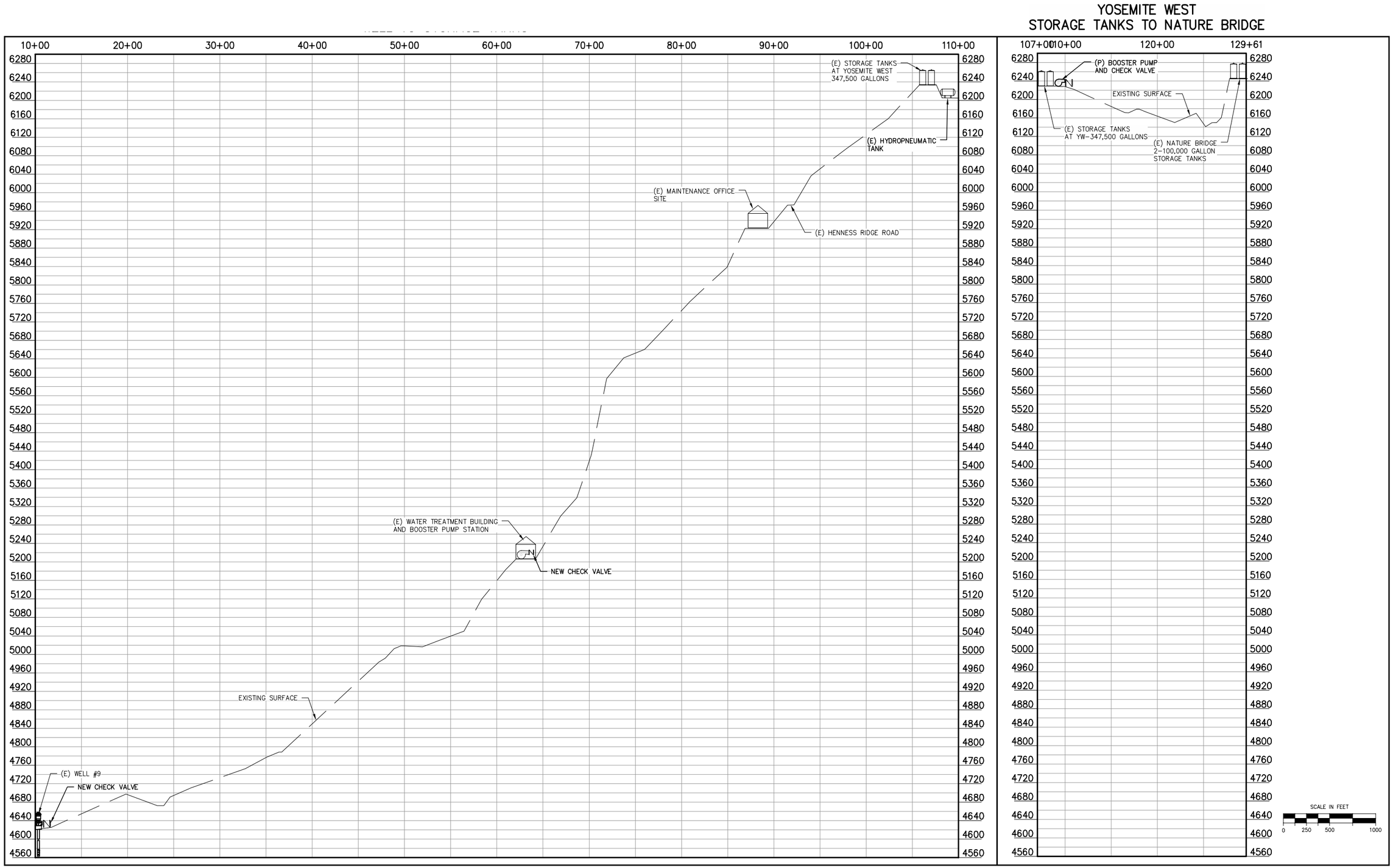


3.2.2.2 Potential interconnection of water storage tanks

The proposal being evaluated is the impact of the proposed new water service to NPS for the benefit of the NESC on the YWWSA. While interconnection of the YWWSA and Chinquapin water storage tanks was not contemplated by the NPS application, DDW recommended the interconnection in their advisory comments.

Interconnection the YWWSA and Chinquapin water storage tanks is physically feasible. Figure 3-7 illustrates the existing hydraulic profile of the Yosemite West water system and a profile of a conceptual water supply pipeline between the YWWSA and Chinquapin water storage tanks. However, there are numerous jurisdictional constraints between the federal government and a local county owned water system that would have to be identified and overcome to address. The Federal Government owns the NPS Chinquapin Water System infrastructure and the underlying NPS land. Should the Chinquapin tanks be added to the YWWSA, DDW would require an amendment to the YWWSA water system permit. As such, DDW would expect that the County have complete rights and access to the Chinquapin water storage tanks interconnecting pipelines for all aspects of operation and maintenance including replacement on NPS property. It is unlikely that the federal government would deed the Chinquapin water storage tanks and any new interconnecting pipelines together with exclusive granted to the County of Mariposa for access with all rights necessary for perpetual operation, maintenance, repair and replacement of water infrastructure. Further, it is unlikely that the County would be willing to accept responsibility and liability for additional water storage tanks and interconnecting pipeline infrastructure on federal property. The current YWWSA water storage tanks are sufficient to support YWWSA.

Figure 3-8: Hydraulic Profile - YWWSA and Chinquapin Water Storage Tanks



4 Findings of Evaluation

4.1 Findings

1) The Utility Service Connection application submitted by the National Park Service is limited to a request for a water service for the NESC campus. The application does not propose to consolidate the Chinquapin Water System with YWWSA, nor does it request an extension of the current Yosemite West water distribution infrastructure to the NESC campus. In discussion with County of Mariposa Public Works Director Mike Healy, the County's interpretation of the request is to provide a water service from an existing Yosemite West distribution main. NPS shall be responsible for the transmission of water to the NESC campus.

2) A logical location for a metered water service would be a new service tap from the distribution main immediately downstream of the YWWSA water storage tanks. After the water service location is set, it appears that NPS will need to install a booster pump to convey water to the Chinquapin water storage tanks. From this location next to the YWWSA water storage tank site, NPS can obtain an electric service from an adjacent PG&E transformer.

3) The YWWSA water system has a sufficient water source and storage capacity to supply water to NPS for the benefit of NESC campus.
    a. The existing Yosemite West Well No. 9 has capacity to replenish current YWWSA average daily water demand plus the anticipated average daily water demand of the NESC campus. Additionally, projections for average daily demand for the future build-out of Yosemite West indicate that the well can support the full built-out of Yosemite West together with the NESC campus.
    b. The two YWWSA water storage tanks, with a combined capacity of 347,000 gallons can provide storage capacity for fire flows plus provide excess storage for operational water system demands of the YWWSA plus the addition of the NESC campus.

4) The existing YWWSA water storage tanks with a total of 347,000 gallons capacity are sufficient to provide fire water and operational storage to support both the Yosemite West water demands together with added daily demand associated with NESC.

5) However, the Yosemite West wastewater treatment and disposal system occasionally runs at or above permitted daily thresholds during the spring months. This evaluation focused on the available water supply for Yosemite West, and ability to serve both Yosemite West and the NESC campus. The County of Mariposa and the Yosemite West community should recognize that capacity of the Yosemite West wastewater treatment and disposal system will be the factor that will eventually limit the ability for the County to continue approving building permits.

6) The State Water Resources Control Board Division of Drinking Water supports the NPS application for a new water service for NESC.

5 Recommendations

Based upon the findings identified in the previous section, recommend approval of NPS application for a new water service for the benefit of NESC campus with the following conditions.

1) NPS shall be subject to the County's established connection fee of $2,850 per Equivalent Dwelling Unit for the Yosemite West infrastructure services. The full fee shall be charged, even though NPS is only requesting a water service (No sewer service is requested).

    a. It is understood that the County Ordinances related to YWWSA connection fees do not include a definition of an Equivalent Dwelling Unit (EDU). Given the commercial nature of the NB campus operation, recommend that the County charge a connection fee based on an EDU determination based on the NESC campus's projected water demand.

    b. First, a water demand for an EDU must be established. Recommend that the County's 5-year average data be used as the basis to calculate an EDU. The 5-year monthly average daily demand ranges from 16,638 gpd for the lower water demand month of February to 40,071 gpd for the highest water demand month of August. The calculated average daily demand based on monthly meter reading data for the 5-year data set is 27,700 gallons per day. This equates 156 gpd per water service (based on 177 services). Recommend definition of EDU as 156 gpd/connection.

    c. Recommend connection fee based on NESC estimated water demand of 7,500 gpd divided by 156 gpd/EDU. The projected water demand for the NESC campus is equates to 48 EDUs. Therefore, the Connection Fee shall be $2,850/connection x 48 EDUs = $136,800.00

2) Recommend that County of Mariposa and NPS enter into a legal agreement regarding the following aspects of the water service connection.

    a. NPS shall agree to physically segregate the Chinquapin water storage tanks and water loop through the NESC campus from the balance of the Chinquapin water system. NPS shall provide as-built engineered plans detailing the water system disconnection from the portion serving NESC campus.

    b. NPS shall agree that no additional water service connections shall be tapped from the NESC campus water system other than those associated with the full build-out of the NESC campus.

    c. NPS shall agree that the NESC shall remotely monitor the YWWSA water meter and incorporate this data into their planned infrastructure monitoring and reporting for the entire campus.

    d. NPS shall complete the necessary engineering, design, environmental compliance, permitting and construction of all necessary infrastructure to transmit the water supply from the YWWSA metered connection next to the YWSSA water storage tanks to the Chinquapin water storage tanks above the NESC campus.

Appendix A: NPS Application to County of Mariposa for Water Service

Mariposa County
Department of Public Works

Airport – Cemeteries – Engineering – Facilities
Fleet Maintenance – Parks & Rec – Plant Operations
Roads – Solid Waste – Surveyor – Transportation

4639 Ben Hur Road
Mariposa, CA 95338
(209) 966-5356 office
(209) 966-2828 fax
www.mariposacounty.org

Team, Service, Stewardship

UTILITY SERVICE CONNECTION APPLICATION

Date of Application 8/26/19

Applicant Name Yosemite National Park

Applicant Address PO Box 577 YNP, CA. 95389

Driver's License State _____ License Number _____

Service Address Nature Bridge Campus, Yosemite West
7330 Henness Ridge Road

Is this a Residential or Commercial Account Commercial

Phone Number 209 372 0201

Circle All That Apply

Applicant is an (✓OWNER) RENTER Property Manager

UTILITY	**SERVICE REQUESTED** (Circle all that apply)	
Coulterville	Water	Wastewater
Lake Don Pedro		Wastewater
Yosemite West	(✓Water)	Wastewater
Mariposa Pines		Wastewater

DATE OF SERVICE START Fall, 2019

Appendix B: State Water Resources Control Board, Division of Drinking Water Correspondence with the County of Mariposa

CALIFORNIA
Water Boards

GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

September 9. 2019

System No. 2210924

Supervisor Rosemarie Smallcomb,
Mariposa County Board of Supervisors – District 1
5100 Bullion Street
Mariposa, CA 95338

Dear Supervisor Smallcomb:

RE: Expansion of the Yosemite West Service Area to Serve the YNP – Nature Bridge Campus – Mariposa County

The State Water Resources Control Board – Division of Drinking Water (DDW) is in receipt of your inquiry regarding the request from the Yosemite National Park (YNP) to provide water service to the Nature Bridge Campus in the Yosemite West portion of Mariposa County. The DDW has regulatory jurisdiction over the Yosemite West Water System (System No. 2210924) which includes ensuring the water system is providing an adequate amount of water meeting all primary and secondary drinking water standards. The purpose of this letter is to express the Division's support of projects leading to increased source capacity in the Yosemite West Water System and provide clarification on which portions of the regulations pertain to existing water systems.

The Division recently completed the sanitary survey report (dated September 4, 2019) for a sanitary survey completed on November 6, 2018. The sanitary survey report (enclosed) includes an evaluation on the existing source capacity of the Yosemite West Water System. Section 2.3 of the report identifies the average day during the maximum month as 34 gallons per minute. The maximum day demand (MDD) is estimated by applying a peaking factor of 1.5 to the average day demand during the maximum month resulting in a MDD of 54 gpm. Similarly, the peak hour demand is estimated by applying a peaking factor of 1.5 to the MDD resulting in a peak hour demand of 81 gpm for the Yosemite West Water System. The total source capacity for the single source of supply, Well No. 9, is 85 gpm. As such, the Division concluded that the Yosemite West Water System has adequate source capacity to supply water during average day demand, MDD and PHD periods. The system source capacity evaluation also includes available storage which equates to 347,500 gallons of available storage, thus increasing the overall source capacity of the Yosemite West Water System.

The Division does have the ability to require (per Section 64558, Title 22, California Code of Regulations) a source capacity planning study if it is determined that there is an existing or

potential problem with the system's source capacity or a proposed expansion resulting in an expansion of the service area by more than 20 percent. Based on the most recent source capacity evaluation discussed above, the Division is not requiring a source capacity planning study at this time.

While the System has adequate source capacity to meet the average day demand, MDD and PHD periods, the Division has historically expressed concern about the single source of supply used to serve the Yosemite West Water System. The Yosemite West Water System is remotely located and proves to be challenging to get resources dispatched when there is a need due to a mechanical failure or other emergency. This concern was expressed in the 2012 Water Supply Permit (Special Provision No. 11). In response to the Division's concerns, Mariposa County established an agreement with a neighboring properly owner for an emergency connection whereby an emergency line would be run from the neighboring property to the Yosemite Water storage tank. The Division accepted the arrangement for an emergency connection given the remote location of the Yosemite West Water System and the inability to find a location for a second water supply well. During an emergency, the County would implement extreme conservation measures and utilize the existing storage to meet demands until the repair could be made to the well or the connection to the emergency source of supply could be made.

Increasing Source Capacity:

The Division recognizes the challenges water systems, such as Yosemite West Water System, face when trying to site new wells. As such, source capacity is evaluated utilizing source capacity from all available wells and all available storage capacity. New community water systems must have a minimum of two water sources to ensure redundancy in new water system per the California Waterworks Standards (Section 64554 (c), Title 22, California Code of Regulations). Section 64554 (c) does not apply to the Yosemite West Water System given they are not applying for an initial water supply permit. As mentioned above, the source capacity for the Yosemite West Water System includes the 85 gpm from Well No. 9 as well as the 347,500-gallons of storage which can supply the water system at peak hour demand conditions for 71.5 hours or approximately three (3) days. It is expected system demands could be met using the available storage for closer to one week given the conservation measure which would be implemented thus reducing the demands. Seven days is a significant amount of time which would allow the County to secure the needed resources for the Yosemite West Water System.

Nature Bridge Project:

It is my understanding that the Nature Bridge Campus was built and the initial water supply well is no longer producing an adequate quantity of water. Therefore, the Nature Bridge Project is discussing a possible service connection to the Yosemite West Water System. While the Nature Bridge Project does not have a well because it has gone dry, the project does include a 200,000-gallon storage tank which could be added to the Yosemite West water system in exchange for water service from Yosemite West Water System. The addition of 200,000-gallons of storage would bring the total storage capacity to 547,500-gallons. This increase in the total storage capacity would enable the system to supply water under peak demand conditions for approximately 113 hours (approximately 4.7 days). The additional storage capacity would make

the Yosemite West Water System more resilient and able to continue to provide the same level service for almost five days under peak demand conditions.

Senate Bill 1263:

The Nature Bridge Project does not have a water supply permit. As such, the YNP would be required to submit a technical report to the Division evaluating the need to form a new public water system as outlined by Senate Bill 1263 (SB1263). Specifically, SB1263 requires all new proposed public water systems, such as Nature Bridge, to evaluate the feasibility of connecting (establishing service) with any community water system within three miles of the proposed public water system. The Division is committed to preventing the formation of new public water systems and attempts to work with neighboring water systems to consolidate or provide service for new publ systems. As such, the Division is encouraged by the discussions between YNP, Y Conservancy, Nature Bridge and Mariposa County in an attempt to create a regional wate supply which will sustain the existing Yosemite West Water System customers, the Nature Bridge Campus and planned future developments for neighboring properties. It is the desire of the Division to have the Nature Bridge development served by Yosemite West Water System rather than Nature Bridge forming a public water system.

consolidation is always a priority

Golden Opportunity:

The Division of Drinking Water sees the Nature Bridge connection along with the source capacity (storage capacity) added to the system as a golden opportunity for the County to make the Yosemite West Water System more resilient and able to meet demands when emergency situations arise. The additional 200,000 gallons of storage will significantly improve the County's ability to meet demands even during emergency situations and provide more flexibility for securing resources and making needed repairs to restore service. It appears that the estimated demands from Nature Bridge (between 7.22 to 8.78 gpm) can be met with the existing source capacity from Well No. 9 and an additional 200,000 gallons of storage would be added bring the total storage capacity to 547,500 gallons for the Yosemite West Water System. As such, the Division encourages Mariposa County to continue to work with Nature Bridge (YNP/Yosemite Conservancy) to establish a service connection with the Yosemite West Water System.

Permit Requirements:

The County is not required to submit a permit amendment application to the Division for the Nature Bridge Campus connection because it does not result in an increase in the service area of more than 20 percent. However, if the County is going to incorporate the 200,000-gallon storage tank on the Nature Bridge Campus into the domestic water supply permit for the Yosemite West Water System, the County will be required to submit a permit amendment application for the new storage tank given its capacity is greater than 100,000 gallons. The Division will need to review th and conduct a site visit of the storage tank prior to giving the County approval to add the gallon storage tank to the existing Yosemite West Water System.

new water supply permit amendment

If you have any questions regarding the information contained in this letter, please contact me at 559-447-3316 or by email at kassy.chauhan@waterboards.ca.gov.

Sincerely,

Kassy D. Chauhan, P.E.
Senior Sanitary Engineer, Merced District
Central California Section
SOUTHERN CALIFORNIA BRANCH
DRINKING WATER FIELD OPERATIONS

Enclosures

cc: Mariposa County Public Works Department – Mr. Mike Healy
Mariposa County Environmental Health Department

CALIFORNIA
Water Boards

GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

September 4, 2019

System No. 2210924

Mr. Darryl Nielsen, Operator
Yosemite West Water System
4639 Ben Hur Road
Mariposa, CA 95338

are we doing this too or is this going to be separate from the water connection?

RE: 2018 Sanitary Survey of the Yosemite

Dear Mr. Nielsen:

On November 6, 2018, Christopher Barber of this office conducted a sanitary survey/inspection of the Yosemite West water system (System) and its operation. The purpose of this letter is to inform you of the following items requiring action which were noted during the inspection and a subsequent file review:

1. The System must submit a plan and schedule for the plans for Wells Nos. 1 and 5 to the Division by October 31, 2019. If the System intends to destroy the wells, it must do so by July 31, 2020.

2. The System must submit an Operations Plan for the Lowry Aeration treatment system to the Division for review and approval by October 31, 2019. The System must submit an Operations Plan to avoid enforcement actions for violating the current water supply permit.

3. The System must submit a revised BSSP to the Division for review and approval by September 30, 2019. Appendix C contains guidelines for creating a BSSP.

4. By September 30, 2019, the System must submit a Consumer Confidence Report certification form to the Division.

5. The System must conduct the next round of lead and copper tap monitoring (5 samples) in 2019 between June 1st and September 30th.

Please provide a written response to this letter by September 30, 2019. If any of the aforementioned items have been addressed, please send evidence of completion along with the written response. Enclosed for your information is a copy of the report prepared by Christopher following the inspection, the Last/Next Source Monitoring Schedule, Lead and Copper Reporting Forms, Bacteriological Sample Siting Plan Guidelines, and inspection photos. Please review the report and provide any comments or clarifications you have to this office.

The assistance provided to Christopher during this review was greatly appreciated. If you have any questions or need additional information, please contact the Merced District Office at (559) 447-3300.

Sincerely,

Kassy D. Chauhan

Kassy D. Chauhan, P.E.
Senior Sanitary Engineer
Merced District
Central California Section
SOUTHERN CALIFORNIA BRANCH
DRINKING WATER FIELD OPERATIONS

cc: Mariposa County Environmental Health Department
Mike Healy, Public Works Director

State Water Resources Control Board
Division of Drinking Water

TO: Kassy Chauhan, P.E.
Merced District
Drinking Water Field Operations Branch

FROM: Christopher Barber
Sanitary Engineer
MERCED DISTRICT

DATE: September 4, 2019

SUBJECT: SANITARY SURVEY
YOSEMITE WEST WATER SYSTEM
SYSTEM NO. 2210924
MARIPOSA COUNTY

I need more information on this, and how this process works/ what is involved on our end.

I. INTRODUCTION

On November 6, 2018, I conducted a sanitary survey of the Yosemite West (System) water system and reviewed its operations. The System maintains and operates the potable water system which serves a small community in Yosemite National Park. I was the last person from the Division to inspect the water system on November 19, 2015.

1.1 DESCRIPTION OF SYSTEM

The Yosemite West Water System serves a community situated in Yosemite National Park in Mariposa County. The source of supply for the water system is groundwater from Well No. 09 that is treated by aeration and chlorination. The treated water is distributed among two pressure zones. The System serves an approximate population of 420 through 172 service connections.

1.2 PERMIT COMPLIANCE

The System currently operates under a domestic water supply permit (No. 03-11-12P-038) that was granted by the Division (formerly the California Department of Public Health) in December 2012. The water supply permit contains twelve special provisions which are listed as follows:

1. The only permitted source shall be the following active source for domestic supply. The inactive sources cannot be used without permit approval:

Source Name	PS Code	Status
Well No. 09	2210924-003	Active Raw
Well No. 01 – Inactive	2210924-001	Inactive Raw
Well No. 05 - Inactive	2210924-002	Inactive Raw

2. Continuous chlorination treatment shall be provided for the use of the Lowry aeration treatment.
3. The Lowry aeration system classifies the system as a T1 water treatment facility in accordance with Title 22 of the California Code of Regulations. The required certification levels of the chief operator and shift operator are both T1.
4. The distribution system is classified as a D1 system in accordance with Title 22 of the California Code of Regulations. The required minimum certification levels of the chief operator and shift operator are both D1.
5. The water system shall begin the Lead and Copper Rule compliance monitoring sequence with two initial six month rounds of lead and copper monitoring from the existing 10 routine sample sites within one month after the Lowry aeration corrosion control treatment system is operational.
6. The corrosion control treatment monitoring shall include Water Quality Parameter monitoring that consists of the following: (1) treated water monitoring at the entry point to the distribution system at frequency of once every two weeks for pH and alkalinity and (2) customer tap monitoring at least every six months from one sample location in the distribution system. A sampling plan shall provide the address of the distribution sample location and that it is representative of the distribution system.
7. Monitoring shall be conducted for the performance of the Lowry aeration treatment plant. The report shall include weekly monitoring for influent flow rates, raw and treated water pH and alkalinity, and effluent chlorine residuals. The aeration treatment shall increase the treated water pH to 7.5 or more based on a monthly average.
8. The water system shall submit an Operations Plan for the Lowry aeration system within 30 days of start-up that addresses the monitoring requirements, description of the alarm settings and actions to be taken, the criteria for temporary bypass of the Lowry aeration system and plant staffing levels.
9. The water system shall conduct the monitoring required by the appended Water Quality Monitoring Schedule.

10. Raw well water samples (ahead of chlorination) shall be collected at a minimum frequency of once a month from each active well for analysis of total coliform and E. coli bacteria. The coliform tests shall be performed using a density analytical method and the results reported in units of MPN/100 mL. The results shall be submitted to the Department by the 10th day of the following month.
11. By January 15, 2013, Yosemite West shall submit a plan and time schedule for providing at least one other source of supply that includes alternatives for the rehabilitation of inactive wells, drilling a new well, emergency interconnections to other approved well sources and any future developments in the area. It shall include contingency plans that include alternatives such as water hauling, emergency water conservation measures, closing rental housing, etc. It is recommended that these contingency measures be provided in the annual Consumer Confidence Report.
12. By February 15, 2013, the water system shall conduct and submit a cross-connection control survey of its customers. A written report of the survey with recommendations for any necessary backflow protection and a time schedule for implementation of the recommendations shall be submitted to the Department. The survey shall be conducted under the supervision of a certified cross-connection control specialist.

The System complies with all permit provisions with the exception of Permit Provision 7. The pH result of the aeration ranges from 6.5-7.2. While the System is not meeting this provision, the lead and copper results from the distribution system are below the action levels. Since the installation of the aeration treatment, lead levels in the distribution system have ranged from 0.002 mg/L to 0.0056 mg/L while the copper levels have ranged from 0.16 mg/L to 1.1 mg/L. As a result, an updated Operations Plan will define the operational parameters of the treatment. Regarding Provision 11, in 2013 the System submitted a plan for the addition of a second source. Please refer to the Adequacy of Supply section for addition details regarding this plan. The Provision No. 12 has been satisfied and the next cross-connection control survey should be completed if a commercial connection is added or requested by the Division.

1.3 ENFORCEMENT

No enforcement actions have been issued since the last sanitary survey.

II. INVESTIGATION AND FINDINGS

2.1 SOURCES OF SUPPLY

The System's domestic water supply is groundwater obtained from one active groundwater well. A description of the source is listed below.

Sources

Groundwater

Well No. 9 (Active Raw)

Well No. 9 (PS Code 2210924-003) was drilled in 1980 to a depth of 325 feet. The borehole contains a $6^{5}/_{8}$-inch diameter steel casing and grout annular seal to a depth of 100 feet. The well is open bottom from 100 feet to 325 feet. A 3-foot by 3-foot sanitary seal is installed and appears to be in good condition.

Well No. 9 is equipped with a 40-hp submersible pump set to a depth of 189 feet capable of producing between 85 gpm and 105 gpm. The well appurtenances include a casing vent that was downturned and screened. The well discharge piping includes a check valve, flow meter and sample tap. The well is housed in a small building that is kept locked at all times. Due to a recent forest fire that occurred prior to the site visit, the building was wrapped with a fireproof foil.

Inactive Wells

Wells Nos. 1 and 5 were disconnected and inactivated and neither well has been replaced. The combined production capacity was reportedly about 28 gpm when they were inactivated, which reportedly became dewatered during the late summer months. **The System must submit a plan and schedule for the plans for Wells Nos. 1 and 5 to the Division by October 31, 2019. If the System intends to destroy the wells, it must do so by July 31, 2020.**

Well No. 1 (Inactive Disconnected)

Well No. 1 was drilled in 1980 via the air rotary method to a depth of 280 feet. The borehole contains a 6-inch diameter plastic casing and a grout annular seal from 0 to 30 feet. Well No. 1 is located approximately 200 feet from the County's maintenance yard. Well No. 1 is located in a meadow in the upper part of the East Creek drainage area.

Well No. 5 (Inactive Disconnected)

Well No. 5 is located near the intersection of Henness Circle and Henness Ridge Road about 70 yards from Well No. 1. This well is also located in the upper part of the East Creek drainage area. It was drilled to a depth of 200 feet via the air rotary method in 1988. The borehole contains an 8-inch diameter plastic casing and a grout annular seal to a depth of 50 feet.

The System indicated that there are approximately 10 or 11 abandoned wells in the area which could have previously been a part of the water system prior to Mariposa County assuming

responsibility. The wells that are known about are on private property and are capped. The System indicated that the installed caps are mostly plates welded to the well casing that are in poor condition.

2.2 TREATMENT

Aeration and Chlorination Treatment

The corrosive properties are from the natural occurrence of dissolved carbon dioxide along with the low mineral content and alkalinity of the groundwater. The raw water monitoring indicated that the pH levels ranged from 5.84 to 6.40. As a result, the System would consistently exceed the copper action level in the distribution system. The water system installed a package aeration system designed to adjust the pH and bring the system into compliance with the copper Action Level (AL) of the Lead and Copper Rule (LCR). Post chlorination is required as a post treatment measure. The aeration system is a Lowry package system. The County provided the necessary chemical analyses and the vendor assured the water system that the water would meet the copper AL.

The System is required to conduct routine monitoring for the treated water leaving the plant at a minimum frequency of once every two weeks for pH and alkalinity in conformance with the corrosion control treatment requirements of the LCR. Customer tap monitoring is required every 6 months from at least one location in the distribution system. It is recommended that this site be selected from a location with historical high copper levels that is an actively used service connection.

The Lowry package system is housed in the booster pump station building, which is designed for snow conditions. The unit installed has a capacity of 125 gpm and is described as a Deep Bubble Multi-Stage Aeration system equipped with a DB63P air stripper vessel and Model VB-075 air blower. The treatment system utilizes horizontal flow into an enclosed rectangular basin divided into multiple chambers separated by vertical baffle plates with holes. Each chamber is fed air from a header pipe and tee shaped piped with diffusers. Air is forced into the bubbler diffusers using a blower that produces an air to water ratio of 25.4 to 1 to remove dissolved carbon dioxide. The rectangular basin has dimensions of 9.5 feet length, 5 feet width and 5.2 feet height. The system is equipped with a control panel that can be operated by the water system's SCADA system. The Lowry design criteria for the package system are shown below:

Well No. 9 Water Quality Parameters Used

Inlet Water Parameter	Value
Design Flow Rate, gpm	125
Carbon Dioxide, mg/L	78.7
Temperature, degrees C	10
Alkalinity, mg/L as CaCO3	32
Air/Water ratio	25.4:1

Predicted Treated Water Quality

Treated Water Parameter	Value	Comments
Carbon Dioxide Removal, %	>98	Equilibrium CO_2 = 0.748 mg/L (cannot be removed)
pH	7.5-7.6	
Theoretical Copper Solubility, mg/L	0.631	Actual field Cu is normally much lower than theoretical value

While the predicted pH value was 7.5-7.6, the System can reliably achieve 6.5-7.2. As a result, the System has been out of compliance with permit provision 7 which requires a finished water pH of 7.5 at a minimum. While the System has not complied with the permit provision, the System has been in compliance with the monitored customer tap lead and copper levels. As a result, the Division will allow the System to continue to operate the treatment facility. The target pH of the treatment will instead be outlined in the Operations Plan that is requested below.

The package Lowry system is designed with process controls and alarms for mechanical failures that include a malfunctioning blower and water levels, which activate an alarm. The alarm system notifies the operators using an auto dialer through the SCADA system and triggers the automatic shutdown of the system. The piping is designed for a manual bypass of the Lowry component for maintenance and repairs.

The post-aeration treatment consists of an erosion type of chlorination system that was selected to due to limited winter access to the treatment building that contains the main booster pump station. The County has installed redundant twin Accu-Tab® erosion chlorinators. The chlorine residual is analyzed using a continuous W&T Depolox 3 chlorine residual analyzer and is connected to the SCADA system. The SCADA system controls and monitors the operation of Well No. 9, booster pumps and Lowry aeration system. If a system failure occurs the SCADA will shut down all the components and dial the operators. A data logger in the SCADA system records the pH, chlorine residual and any alarms. There is no chart recorder.

As mentioned earlier in this report, an updated Operations Plan is required. The updated Operations Plan must include the target pH, operational pH range, chlorination procedures and normal operator duties. **The System must submit an Operations Plan to the Division for**

review and approval by October 31, 2019. The System must submit an Operations Plan to avoid enforcement actions for violating the current water supply permit.

Monitoring and Reporting

The System currently submits monthly reports to the Division containing data from the aeration and chlorination treatment. Once every other week the System collects the raw water pH; treated water pH, alkalinity, chlorine residual; along with the pH and chlorine residual from a sample tap in the distribution system. The permit requires that the System monitors the parameters indicated in the following table:

Water Parameter	Frequency
Influent Flow Rate	Weekly
Raw Water pH	Weekly
Raw Water Alkalinity	Weekly
Treated Water pH	Weekly
Treated Water Alkalinity	Weekly
Effluent Chlorine Residual	Weekly
pH at Entry to Distribution System	Once Every 2 Weeks
Alkalinity at Entry to the Distribution System	Once Every 2 Weeks
Customer Tap	Once Every 6 Months

2.3 ADEQUACY OF SUPPLY

The 2018 electronic Annual Report to the Drinking Water Program (e-ARDWP) shows that System produced 10,471,000 gallons in 2018. The maximum month of production was in July when approximately 1,536,000 gallons (36 gpm) of water was produced. The maximum day demand (MDD) was not reported but can be approximated by multiplying the average day production during the maximum month by a peaking factor of 1.5. The MDD is estimated to be 54 gpm. The peak hour demand (PHD) can be estimated by applying a peaking factor of 1.5 to the maximum day demand. The estimated peak hour demand is approximately 81 gpm.

The capacity of the system is limited by the well capacity which is approximately 85 gpm. In the event of insufficient water production capability, the System has 347,500 gallons of storage which is able to supply the System for over 2 days of PHD usage.

The plan listed three options, entering into an agreement for an already established source, rehabilitate an old well, or drill a new well. The System indicated that no agreement was reached regarding an established source. The System is no longer interested in rehabilitating an old source as the production capacities are too low. The System currently considering purchasing the

property for a new well. The location of the new well would be located along the transmission line from Well No. 9 to the aeration treatment plant.

2.4 STORAGE

The water system contains a maximum storage capacity of 347,500 gallons (gross) from two tanks. Water is boosted over 1,000 feet of elevation from twin booster pumps that are activated using tank water level sensors in the tanks. The well water is pumped to two ground level storage tanks located side-by-side on a hill located at the top of the distribution system. One tank is listed as a 157,500-gallon bolted steel tank that was constructed in 1967 and the other tank is a 190,000-gallon welded steel tank that was constructed in 1978. The tanks have common inlet/outlet pipes and the two tanks are interconnected. The older bolted steel tank is a converted oil field tank and has two bolted lids. The screens and hatches on the tanks appeared to be in adequate condition. The tops of the storage tanks were inspected during the site visit.

The tanks were cleaned and inspected in June 2009 using divers. The final report indicates that the tanks are in adequate condition and recommends that the System routinely cleans and inspects the tanks to maintain integrity. A copy of the 2009 tank inspection report is on file with the Division. The Division recommends that the tanks be inspected at least once every 5 years. The System should submit a time schedule for cleaning and inspecting the storage tanks.

2.5 DISTRIBUTION SYSTEM

The distribution is classified as a D1 system, based on the number of service connections and population served. The distribution system consists of six pressure zones that consist of one main pressure zone fed by gravity flow from the storage tanks and five smaller zones created by ten pressure reducing valve stations, located in vaults in the subdivision. Two of the vaults have drains that are located near the road side. The remaining vaults are located in the middle of the roads and have no drains. The distribution system consists of 4 and 6–inch diameter asbestos cement (AC) pipe with ¾-inch service laterals.

Water main repairs are made under pressure and mains are isolated for major repairs. The County has adopted standards that are in accordance with the disinfection, flushing and sampling requirements of AWWA standards. The system has certified distribution system operators to oversee these activities.

The System uses AWWA C-900 Class 150 PVC for all new water main installations. There is no formal or routine flushing procedures. Flushing only occurs as needed. There are approximately 24 isolation valves installed in the distribution system. The valves are normally exercised when the lines are flushed or as needed. The Division recommends that dead-ends are flushed routinely to maintain water quality and isolation valves are exercised on an annual basis to ensure proper operation. No low head water lines exist in the system and water/sewer line separation is adequate. System pressures range from about 40 to 60 psi.

2.6 OPERATION AND MAINTENANCE

The Chief Operator, Darryl Neilson (D2, T2), is responsible for oversight of the water system. The chief operator of the System must have at least D1 and T1 certification and the shift operator must have at least D1 and T1 certification. The System meets the operator certification requirements.

Maintenance of the water system consists of weekly visits to the well and aeration treatment facilities by one the certified operators for required monitoring and operation of the treatment process. The storage tanks are visited monthly. Any necessary adjustments or maintenance work is performed during these visits. In addition, the System checks the tops of the storage tanks on an annual basis to check the condition of the vents and hatches. Any vegetation (leaves, branches, etc.) is also removed from the tops of the tanks at this time.

Operations Plan

The System must submit an updated Operations Plan. The updated Operations Plan must include the target pH, operational pH range, chlorination procedures and normal operator duties. **The System must submit an Operations Plan to the Division for review and approval by October 31, 2019. The System must submit an Operations Plan to avoid enforcement actions for violating the current water supply permit.**

Cross-Connection Control Program

The System indicated that there are no backflow assemblies installed in the distribution system. The Division requires that all backflow assemblies are continued to be tested annually. The System also conducted a cross-connection control survey in 2013. No issues needed to be addressed. A new cross-connection control survey should be completed in the event of the addition of commercial service connections. The System should continue to monitor the distribution system for potential sources of potential cross-connections.

Emergency Notification Plan (ENP)

The System has an Emergency Notification Plan (ENP) dated March 28, 2019, on file with the Division. The ENP lists Darryl Nielson, Mike Healy, and the On-Call Staff. The ENP indicates that larger systems such as the System will use door-to-door delivery, posting notices, social media, and reverse 911 calling for emergency notification. In the event of an emergency, Mr. Nielson will begin the notification process by contacting the necessary personnel. Notification is expected to take about six hours due to the remote location of the water system.

Electronic Annual Report (EAR)

The California Health and Safety Code Section 116530 states that all public water systems shall submit a technical report as required by the Division on an annual basis. The Division requires all water systems to submit the Electronic Annual Report to the Drinking Water Program (EAR) by March 31 of each year for the previous year, detailing population served and number of service connections, water produced and used status of various monitoring requirements and operator certification, system improvements and other information. The System submitted the 2018 EAR.

Building Resiliency

The effects of extreme weather on community water system (CWS) facilities and operations is a concern and priority of the State Water Resources Control Board (SWRCB), which is documented by the SWRCB in its Comprehensive Climate Change Resolution No. 2017-12, adopted in March 2017. DDW is reviewing each water system's level of resiliency and preparedness for changing climate conditions and extreme weather increase awareness to the potential effects to facilities and operations, and encourage the use of EPA's Climate Resilience Evaluation and Awareness Tool (CREAT). The CREAT can be found on the following website:

http://www.epa.gov/crwu

As part of the 2017 and 2018 eARs, CWSs were asked to identify their vulnerabilities, and rank them as either high, medium or low sensitivity, and proposed or implemented projects to prepare for the impacts from climate change. The System provided responses to these questions. The System identified one potential impact that their facilities is vulnerable to:

- Groundwater depletion
- Changes in seasonal runoff and/or loss of snowmelt
- Peak demand volume surges
- Increased fire risk and altered vegetation
- Disruption of power

The Water System has implemented, or is considering implementing, the following projects to address current identified needs and which also reduce the impacts to these vulnerabilities:

- Install new and deeper drinking water wells, or modify existing wells to increase pumping capacity
- Alternate of backup energy supply

The Water System indicated that they were not aware of the CREAT tool developed by USEPA for identifying climate vulnerabilities. The Water System has not used CREAT to identify vulnerabilities to the water system source and facilities. The SWRCB strongly encourages utilities

to evaluate infrastructure and operational vulnerabilities to extreme weather and other emergency conditions using tools such as CREAT and engaging in a conversation both within your water system organization and with customers on how to plan and prepare for being resilient to provide clean and safe water reliably and adequately under all current and future conditions.

Consumer Confidence Report (CCR)

Each year, the System is required to prepare a CCR and distributes it to the customers of the System by July 1st of each year. Within 3 months of distributing the CCR, the water system must submit a certification form and a copy of the CCR to the Division. The System delivered the 2018 CCR to customers on June 27, 2019, and uploaded the CCR to the Division on the same day. The Division did not receive a certification form. **By September 30, 2019, the System must submit a CCR certification form to the Division.**

2.7 SOURCE WATER QUALITY MONITORING

General Mineral, General Physical and Inorganic Chemicals

For groundwater, with the exception of nitrate and asbestos; general mineral, general physical and inorganic chemical monitoring is required once every three years. For the Well No. 9, the System last monitored for most of the aforementioned constituents in September 2018, with the most recent monitoring results in compliance with the primary and secondary maximum contaminant level (MCL) for these constituents.

Nitrate

All water systems are required to conduct annual nitrate monitoring of their active sources. All water systems and laboratories are required to report nitrate results as N with a MCL of 10 mg/L. The most recent nitrate monitoring results for Well No. 9 is listed in the following table.

Source	Sample Date	Nitrate Monitoring Result as N (mg/L)	Next Due
Well No. 9	1/15/2019	ND	1/15/2020

Nitrite

All water systems are required by the Division to conduct triennial nitrite monitoring of their active sources. The most recent nitrite monitoring results for Well No. 9 is listed in the following table.

Source	Sample Date	Nitrite Monitoring Result as N (mg/L)	Next Due
Well No. 9	9/11/2018	0.36	9/11/2021

Organic Chemicals

Volatile Organic Chemicals (VOCs)

The System is required to sample for each of the required volatile organic chemicals (VOCs) on a triennial frequency for Well No. 9. Based on the monitoring history of the source, the Division approved a waiver on September 24, 2018, to reduce the monitoring of the source to once every six years. The System must apply for a waiver prior to the end of each monitoring period to continue on a waived frequency. The next waiver application is due by December 31, 2019. The System last conducted the required VOC monitoring for Well No. 9 in May 2018. All respective analyses results were below the MCL for all required VOCs. The System is to continue the required six-year sampling frequency and next monitor the source for the required VOCs by November. All results are to be submitted to the Division via EDT.

The System must continue to monitor their source in accordance with the water quality monitoring schedule. The last sample and next sample due date monitoring schedule is included in Attachment C.

Synthetic Organic Chemicals (SOCs)

The System is required to monitor for each of the required synthetic organic chemicals (SOCs), atrazine, simazine, and 1.2.3-TCP on a triennial frequency for the groundwater source. The System last completed the required SOC monitoring for Well No. 9 in May 2018 with the exception of 1,2,3-TCP. All respective analyses resulted in non-detects for all required SOCs. Based on the monitoring history of Well No. 9, the Division approved a waiver on September 24, 2018, to reduce SOC monitoring to once every six years. As mentioned in the VOC section, the System must apply for a waiver prior to the end of each monitoring period to continue on a waived frequency, the next waiver application is due by December 31, 2019.

1,2,3-Trichloropropane (1,2,3-TCP)

Beginning in January 2018, all community and nontransient-community water systems were required to begin monitoring all sources for 1,2,3 TCP. Initial monitoring consisted of quarterly monitoring for one year with the first round to be completed in the first quarter of 2018. If a source was determined to be in compliance, monitoring was be reduced to once every six years. The System has completed initial monitoring with all results reported as non-detect. The next monitoring deadline for 1,2,3-TCP at Well No. 9 is due by December 2024.

Radiological

The California Radionuclide Rule became effective on June 11, 2006. Initial monitoring requirements under the California Radionuclide Rule must have been satisfied by December 31, 2007, for existing sources. The System has completed initial monitoring for Well No. 9 for gross alpha and radium-228. The most recent monitoring result for gross alpha at Well No. 9 was 3.6 pCi/L in 2016, which is above the DLR, but below half of the MCL. As a result, the System is required to monitor for gross alpha every six years. The System must next monitor Well No. 9 for gross alpha in 2022. Any time the gross alpha levels exceed 5 pCi/L the sample must also be analyzed for radium-226 (uranium may be monitored for in lieu of radium-226).

Source Bacteriological Monitoring

Since the System uses sodium hypochlorite for disinfection, routine source water bacteriological monitoring is required on at least a monthly basis for total coliform and E. Coli bacteria. Results must be reported in units of MPN/100mL. A review of the raw water quality since the last inspection shows three instances of total (only) coliform detection at the source. In January, February, and March of 2018, levels of total coliform up to 12 MPN/100mL were detected at the source. In each instance subsequent monitoring was absent for coliform bacteria.

2.8 DISTRIBUTION SYSTEM MONITORING

Bacteriological Water Quality

Based on the number of service connections, pressure zones and the population served, the System is required to collect and analyze a minimum of one bacteriological sample per month from within the distribution system. Due to the number of pressure zones in the distribution system, the System currently collects six samples a month from the distribution system. A review of the distribution system monitoring data since January 2016 indicates that there have been no instances of a positive bacteriological sample.

The BSSP on file for the System is dated March 2007. The BSSP lists six routine locations. Four repeat sites are listed for each routine site. The repeat sites include the original site, one upstream site, one downstream site, and the well. The Division requires water systems to update or create a new BSSP every 10 years. **The System must submit a revised BSSP to the Division for review and approval by September 30, 2019. Appendix C contains guidelines for creating a BSSP.**

Asbestos

Currently the System has asbestos-cement piping installed in the distribution system and water that is considered aggressive. As a result, the System must monitor the distribution system for the leaching of asbestos into the distribution system once every nine years. The System last monitored the distribution system for asbestos in December 2017 with a reported result of non-

detect. The next asbestos monitoring from the distribution system is due by December 2026. The PS Code assigned for asbestos monitoring in the distribution system is 2210924-901.

Stage 2 – Disinfection By-Product Rule Monitoring (ST2DBPR)

The System is considered a Schedule IV system under the United States Environmental Protection Agency (USEPA) Stage 2 Disinfectant and Disinfection By-Products Rule (ST2DBPR). Monitoring required by the ST2DBPR began in 2013 and will continue for the System triennially. The most recent result was collected in June 2019. The System must ensure that all ST2DBPR monitoring results are reported to the Division via EDT using the PS Code in the table below.

Site	PS Code	TTHM mg/L	HAA5 mg/L
ST2DBP – 7417 YPW	2210510-900	1.4	Non-Detect

Lead and Copper Monitoring

While under the regulatory jurisdiction of the Division, the System has had numerous copper results that have exceeded the action level. As a result, the System installed the aeration treatment equipment in order to successfully raise the pH of the water in an effort to bring the copper levels in the residences to an acceptable level. All reported lead levels have been under the action level. The following table summarizes the lead and copper tap monitoring results for the System following the installation of the aeration equipment:

Lead and Copper Monitoring History

Sample Date	Sample Interval	No. Required	No. Sampled	Lead 90th Percentile (mg/L)	Copper 90th Percentile (mg/L)
6/17/2014	1st 6 Month	10	10	0.002	1.00
10/7/2014	2nd 6 Month	10	10	0.056	1.10
9/24/2015	1st Annual	10	10	0.031	0.33
9/22/2016	2nd Annual	10	10	0.0036	0.160
1st Triennial round of monitoring due between June 1, 2019 and September 30, 2019					

Based on the Lead and Copper monitoring results submitted since the aeration treatment system was installed, the Division will not allow the System to conduct subsequent monitoring at a reduced frequency (once every three years) at a reduced number of locations (5). **The System must conduct another round of lead and copper tap monitoring (5 samples) in 2019 between June 1st and September 30th.**

As noted, the System must conduct another round of lead and copper tap monitoring (10 samples) in 2019 between June 1st and September 30th. The System must continue to monitor sites that are the most likely to be vulnerable to lead and copper contamination due to corrosion issues. Upon

review of the historic lead and copper monitoring results shows that the System changed five monitoring locations since the previous monitoring period. The System did not indicate why the locations were changed in the reporting forms. The System is required to identify any changes in the Lead and Copper Tap Sampling Site Change Form. The Division is now using new forms for reporting Lead and Copper monitoring results and the changing of addresses. Both of these forms must be used and are included in Appendix D. The following table lists the current sites monitored for lead and copper:

Lead and Copper Sample Sites

7509 Hennes Circle
7540 Hennes Circle
7396 Yosemite Parkway
7288 Yosemite Parkway
7426 Hennes Ridge
7226 Yosemite Parkway
7292 Buck Brush Lane
7193 Yosemite Parkway
7330 Yosemite Parkway
7417 Yosemite Parkway

All participants should be notified of the results collected from their residents, and a special notice should be sent if the results are greater than the action level at the customer's home.
The Division recommends that the System provide the following information on the system's website or physically posting the information with other water quality notices, such as the CCR:

- The latest 90th percentile values for the most recent round of LCR tap sampling; and
- The number of sites sampled, the number of sites that exceeded an action level, and the number of samples that were invalidated (if applicable); and
- Justifications for invalidation of LCR samples (if applicable); and
- Information on the locations of lead service lines in the distribution system, together with a map of the identified areas and an inventory of lead plumbing in the system; and
- Additional health information on how to minimize lead in drinking water if lead was detected above the action level in more than 5%, and up to and including 10%, of sites sampled. The health information language specified in Section 64482(c), Chapter 15, Title 22 of the Consumer Confidence Report regulations may be used for this purpose.

Permit Amendment No. 2017PA_Schools

On January 17, 2017, the Division issued Permit No. 2017PA_Schools to the System. This permit amendment defined the System's responsibilities regarding the monitoring of lead in K-12 public schools. The permit amendment also included sampling guidance to further assist in the monitoring.

AB 746 – Lead Sampling in Schools

California Assembly Bill 746 (AB 746) was approved by the Governor and published on October 13, 2017. The bill required all community water systems that serve a school site of a local educational agency with a building constructed before January 1, 2010, to test for lead in the potable water system of the school site on or before July 1, 2019. All community water systems are required to contact public K-12 schools within their service area to arrange a time to meet and discuss the sampling procedures. Section 116277 was added to the Health and Safety Code (HSC 116277), outlining these requirements, which became effective on January 1, 2018.

The System indicated that it does not serves any public schools.

Water Quality Parameter Monitoring

The System uses aeration treatment to remove dissolved carbon dioxide in the water and raise the pH as a means of corrosion control due to continuous exceedances of the copper action level in the distribution system. Since a corrosion control treatment is being used, Water Quality Parameter monitoring is required. The System has been submitting the results to the Division as required. Water Quality Parameter (WQP) monitoring consists of pH and alkalinity monitoring the entry point to the distribution system from the aeration treatment plant once every two weeks. In addition, one location in the distribution system must be identified and monitored twice every six months for pH and alkalinity. The System must continue to submit the results to the Division monthly.

III. SYSTEM APPRAISAL

The Yosemite West water system is ...on and is capable of supplying safe and potable water, which meets all o... ...rinking water standards.

The System needs to address the following issues that were noted during the inspection and subsequent file review:

1. The System must submit a plan and schedule for the plans of Wells Nos. 1 and 5 to the Division by October 31, 2019. If the System intends to destroy the wells, it must do so by July 31, 2020.
2. The System must submit an Operations Plan for the Lowry Aeration treatment system to the Division for review and approval by October 31, 2019. The System must submit an Operations Plan to avoid enforcement actions for violating the current water supply permit.
3. The System must submit a revised BSSP to the Division for review and approval by September 30, 2019. Appendix C contains guidelines for creating a BSSP.

This looks like it needs to get done? have to 2 wells been destroyed?

is this done?

this?

4. By September 30, 2019, the System must submit a Consumer Confidence Report certification form to the Division.

5. The System must conduct the next round of lead and copper tap monitoring (5 samples) in 2019 between June 1st and September 30th.

Appendices

Appendix A: System Photos from November 6, 2018 Sanitary Survey
Appendix B: Last/Next Source Monitoring Schedule
Appendix C: Guidelines for Creating a Bacteriological Sample Siting Plan
Appendix D: New Lead and Copper Monitoring Forms

Appendix A

System Photos from November 6, 2018 Sanitary Survey

Photo 1; Wellhouse with Fire Resistant Foil

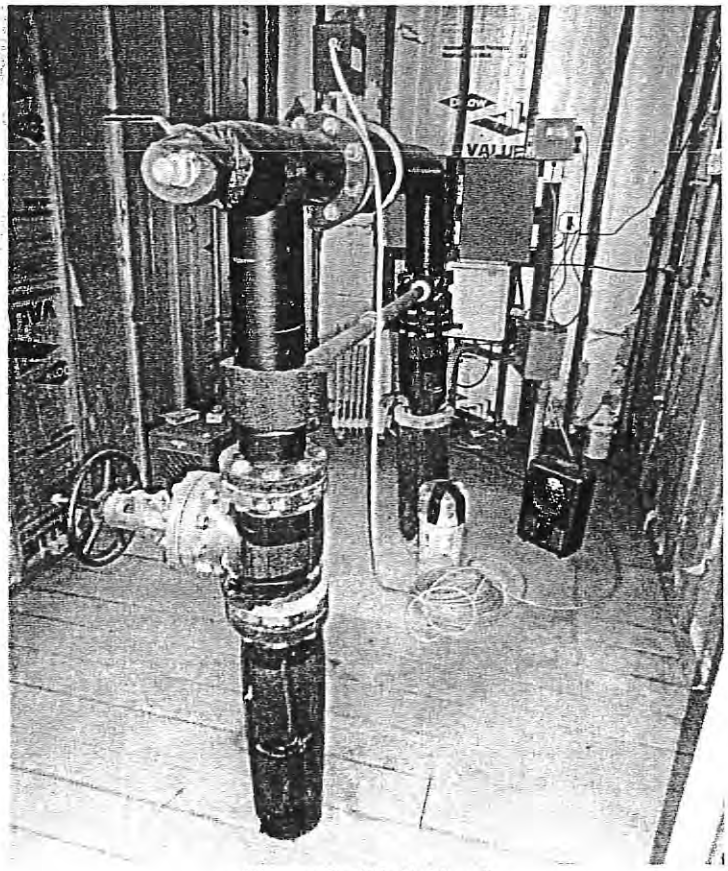


Photo 2; Well No. 9

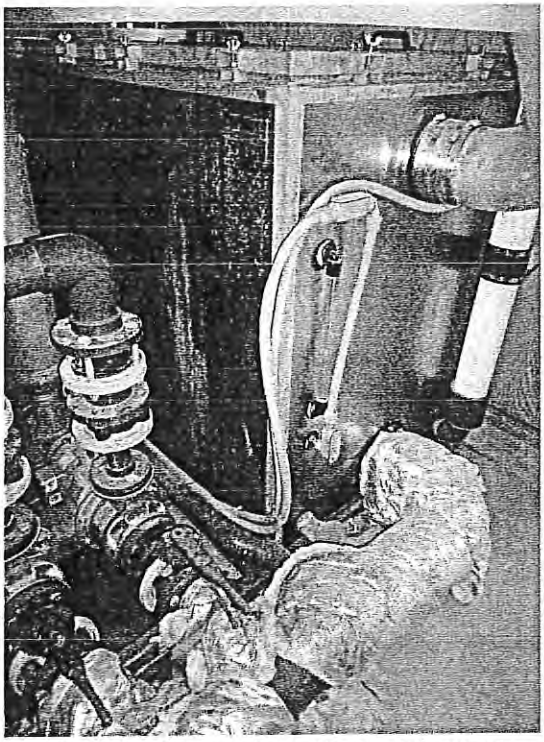


Photo 3; Lowry Aeration Equipment

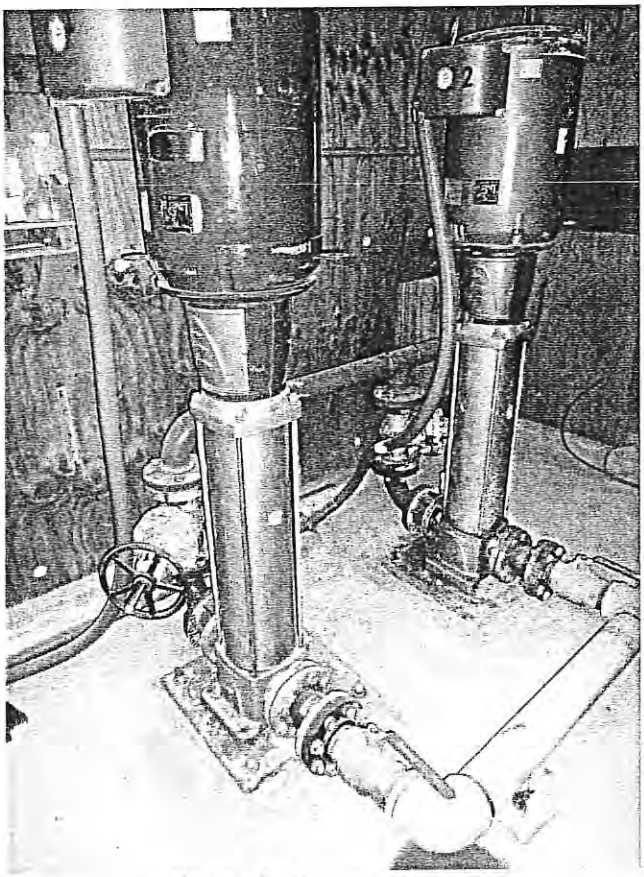


Photo 4; Booster Pumps

Appendix B

Last/Next Source Monitoring Schedule

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210924 NAME: YOSEMITE WEST WATER SYSTEM COUNTY: MARIPOSA

SOURCE NO: 003 NAME: WELL 09 CLASS: CTGD STATUS: Active

PSCODE	GROUP/CONSTITUENT IDENTIFICATION		LAST RESULT	UNITS	MCL	DLR	LAST SAMPLE	COUNT	FREQ MONTHS	MOD	NEXT SAMPLE DUE	NOTES
2210924 - 003	**YOSEMITE WEST WATER SYSTEM**		**003**	**WELL 09**								
GP	**SECONDARY/GP**											
00440	BICARBONATE ALKALINITY		30	MG/L	--------	--------	2018/09/11	8	36		2021/09	
00916	CALCIUM		5.1	MG/L	--------	--------	2019/04/23	9	36		2022/04	
00445	CARBONATE ALKALINITY	<	ND	MG/L	--------	--------	2018/09/11	8	36		2021/09	
00940	CHLORIDE	<	ND	MG/L	500	--------	2018/09/11	8	36		2021/09	
00081	COLOR	<	ND	UNITS	15	--------	2018/09/11	8	36		2021/09	
01042	COPPER	<	ND	UG/L	1000	50	2018/09/11	9	36		2021/09	
38260	FOAMING AGENTS (MBAS)	<	ND	MG/L	.5	--------	2018/09/11	8	36		2021/09	
00900	HARDNESS (TOTAL) AS CACO3		17	MG/L	--------	--------	2019/04/23	6	36		2022/04	
71830	HYDROXIDE ALKALINITY	<	ND	MG/L	--------	--------	2018/09/11	8	36		2021/09	
01045	IRON	<	ND	UG/L	300	100	2018/09/11	8	36		2021/09	
00927	MAGNESIUM		0.91	MG/L	--------	--------	2019/04/23	9	36		2022/04	
01055	MANGANESE	<	ND	UG/L	50	20	2018/09/11	8	36		2021/09	
00086	ODOR THRESHOLD @ 60 C		1.0	TON	3	1	2018/09/11	8	36		2021/09	
00403	PH, LABORATORY		5.8		--------	--------	2018/09/11	19	36		2021/09	
01077	SILVER	<	ND	UG/L	100	10	2018/09/11	8	36		2021/09	
00929	SODIUM		4.8	MG/L	--------	--------	2018/09/11	8	36		2021/09	
00095	SPECIFIC CONDUCTANCE		51	US	1600	--------	2018/09/11	8	36		2021/09	
00945	SULFATE	<	ND	MG/L	500	.5	2018/09/11	8	36		2021/09	
70300	TOTAL DISSOLVED SOLIDS		48	MG/L	1000	--------	2018/09/11	8	36		2021/09	
82079	TURBIDITY, LABORATORY		0.20	NTU	5	.1	2018/09/11	8	36		2021/09	
01092	ZINC		12	UG/L	5000	50	2018/09/11	8	36		2021/09	
IO	**INORGANIC**											
01105	ALUMINUM	<	ND	UG/L	1000	50	2018/09/11	8	36		2021/09	
01097	ANTIMONY	<	ND	UG/L	6	6	2018/09/11	7	36		2021/09	
01002	ARSENIC	<	ND	UG/L	10	2	2018/09/11	8	36		2021/09	

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210924 NAME: YOSEMITE WEST WATER SYSTEM COUNTY: MARIPOSA

SOURCE NO: NAME: WELL 09 CLASS: CTGD STATUS: Active

PSCODE		GROUP/CONSTITUENT IDENTIFICATION		LAST RESULT	UNITS	MCL	DLR	LAST SAMPLE	COUNT	FREQ MONTHS	MOD	NEXT SAMPLE DUE	NOTES
2210924 - 003	**IO**	**INORGANIC**											
	81855	ASBESTOS		ND	MFL	7	.2	2016/11/08	2	108		2025/11	
	01007	BARIUM		23	UG/L	1000	100	2018/09/11	8	36		2021/09	
	01012	BERYLLIUM	<	ND	UG/L	4	1	2018/09/11	7	36		2021/09	
	01027	CADMIUM	<	ND	UG/L	5	1	2018/09/11	8	36		2021/09	
	01034	CHROMIUM (TOTAL)	<	ND	UG/L	50	10	2018/09/11	8	36		2021/09	
	00951	FLUORIDE (F) (NATURAL-SOURCE)	<	ND	MG/L	2	.1	2018/09/11	8	36		2021/09	
	71900	MERCURY	<	ND	UG/L	2	1	2018/09/11	8	36		2021/09	
	01067	NICKEL	<	ND	UG/L	100	10	2018/09/11	7	36		2021/09	
	A-031	PERCHLORATE	<	4	UG/L	6	4	2018/09/11	3	36		2021/09	
	01147	SELENIUM	<	ND	UG/L	50	5	2018/09/11	8	36		2021/09	
	01059	THALLIUM	<	ND	UG/L	2	1	2018/09/11	7	36		2021/09	
	NI	**NITRATE/NITRITE**											
	00618	NITRATE (AS N)	<	ND	mg/L	10	.4	2019/01/15	20	12		2020/01	
	00620	NITRITE (AS N)		0.36	mg/L	1	.4	2018/09/11	8	36		2021/09	
	RA	**RADIOLOGICAL**											
	01501	GROSS ALPHA		3.6	PCI/L	15	3	2016/03/03	9	108	M	2025/03	
	S1	**REGULATED VOC**											
	34506	1,1,1-TRICHLOROETHANE	<	ND	UG/L	200	.5	2018/05/16	6	72		2024/05	
	34516	1,1,2,2-TETRACHLOROETHANE	<	ND	UG/L	1	.5	2018/05/16	6	72		2024/05	
	34511	1,1,2-TRICHLOROETHANE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34496	1,1-DICHLOROETHANE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34501	1,1-DICHLOROETHYLENE	<	ND	UG/L	6	.5	2018/05/16	6	72		2024/05	
	34551	1,2,4-TRICHLOROBENZENE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34536	1,2-DICHLOROBENZENE	<	ND	UG/L	600	.5	2018/05/16	6	72		2024/05	
	34531	1,2-DICHLOROETHANE	<	ND	UG/L	.5	.5	2018/05/16	6	72		2024/05	

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210924 NAME: YOSEMITE WEST WATER SYSTEM COUNTY: MARIPOSA

SOURCE NO: NAME: WELL 09 CLASS: CTGD STATUS: Active

PSCODE	GROUP/CONSTITUENT IDENTIFICATION			LAST RESULT	UNITS	MCL	DLR	LAST SAMPLE	COUNT	FREQ MONTHS	MOD	NEXT SAMPLE DUE	NOTES
2210924 - S1 003	34541	1,2-DICHLOROPROPANE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34561	1,3-DICHLOROPROPENE (TOTAL)	<	ND	UG/L	.5	.5	2018/05/16	5	72		2024/05	
	34571	1,4-DICHLOROBENZENE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34030	BENZENE	<	ND	UG/L	1	.5	2018/05/16	6	72		2024/05	
	32102	CARBON TETRACHLORIDE	<	ND	UG/L	.5	.5	2018/05/16	6	72		2024/05	
	77093	CIS-1,2-DICHLOROETHYLENE	<	ND	UG/L	6	.5	2018/05/16	6	72		2024/05	
	34423	DICHLOROMETHANE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34371	ETHYL BENZENE	<	ND	UG/L	300	.5	2018/05/16	6	72		2024/05	
	46491	METHYL-TERT-BUTYL-ETHER (MTBE)	<	ND	UG/L	13	3	2018/05/16	5	72		2024/05	
	34301	MONOCHLOROBENZENE	<	ND	UG/L	70	.5	2018/05/16	6	72		2024/05	
	77128	STYRENE	<	ND	UG/L	100	.5	2018/05/16	6	72		2024/05	
	34475	TETRACHLOROETHYLENE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34010	TOLUENE	<	ND	UG/L	150	.5	2018/05/16	6	72		2024/05	
	34546	TRANS-1,2-DICHLOROETHYLENE	<	ND	UG/L	10	.5	2018/05/16	6	72		2024/05	
	39180	TRICHLOROETHYLENE	<	ND	UG/L	5	.5	2018/05/16	6	72		2024/05	
	34488	TRICHLOROFLUOROMETHANE FREON 11	<	ND	UG/L	150	5	2018/05/16	6	72		2024/05	
	81611	TRICHLOROTRIFLUOROETHANE (FREON 113)	<	ND	UG/L	1200	10	2018/05/16	5	72		2024/05	
	39175	VINYL CHLORIDE	<	ND	UG/L	.5	.5	2018/05/16	6	72		2024/05	
	81551	XYLENES (TOTAL)	<	ND	UG/L	1750	0.5	2018/05/16	6	72		2024/05	
S2 REGULATED SOC													
	77443	1,2,3-TRICHLOROPROPANE (1,2,3-TCP)	<	ND	UG/L	0.005	0.005	2018/10/09	4	72		2024/10	
	39033	ATRAZINE	<	ND	UG/L	1	.5	2018/05/16	5	72		2024/05	
	39055	SIMAZINE	<	ND	UG/L	4	1	2018/05/16	5	72		2024/05	

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210924 NAME: YOSEMITE WEST WATER SYSTEM COUNTY: MARIPOSA

SOURCE NO: 900 NAME: ST2DBP - 7417 YPW CLASS: DBPT STATUS: Active

PSCODE		GROUP/CONSTITUENT IDENTIFICATION		LAST RESULT	UNITS	MCL	DLR	LAST SAMPLE	COUNT	FREQ MONTHS	MOD	NEXT SAMPLE DUE	NOTES
2210924 - 900		**YOSEMITE WEST WATER SYSTEM**		**900**	**ST2DBP - 7417 YPW**								
	D BP	**DISINFECTION BYPRODUCTS**											
	32101	BROMODICHLOROMETHANE (THM)		0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	32104	BROMOFORM (THM)		0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	32106	CHLOROFORM (THM)		1.4	UG/L	--------	1	2019/06/18	3	36		2022/06	
	82721	DIBROMOACETIC ACID (DBAA)	<	1.0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	32105	DIBROMOCHLOROMETHANE (THM)		0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	77288	DICHLOROACETIC ACID (DCAA)	<	1.0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	A-049	HALOACETIC ACIDS (5) (HAA5)	<	1.0	UG/L	60	--------	2019/06/18	3	36		2022/06	
	A-041	MONOBROMOACETIC ACID (MBAA)	<	1.0	UG/L	--------	1	2019/06/18	3	36		2022/06	
	A-042	MONOCHLOROACETIC ACID (MCAA)	<	1.0	UG/L	--------	2	2019/06/18	3	36		2022/06	
	82080	TOTAL TRIHALOMETHANES		1.4	UG/L	80	--------	2019/06/18	3	36		2022/06	
	82723	TRICHLOROACETIC ACID (TCAA)	<	1.0	UG/L	--------	1	2019/06/18	3	36		2022/06	

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210924 NAME: YOSEMITE WEST WATER SYSTEM COUNTY: MARIPOSA

SOURCE NO: 901 NAME: ASB-7417 YPW CLASS: OTHR STATUS: Active

FSCODE		GROUP/CONSTITUENT IDENTIFICATION		LAST RESULT	UNITS	MCL	DLR	LAST SAMPLE	COUNT	FREQ MONTHS	MOD	NEXT SAMPLE DUE	NOTES
2210924 - 901		**YOSEMITE WEST WATER SYSTEM**		**901**	**ASB-7417 YPW**								
	IO	**INORGANIC**											
		81855	ASBESTOS	ND	MFL	7	.2	2017/12/06	1	108	M	2026/12	

Appendix C

Guidelines for Creating a Bacteriological Sample Siting Plan

State Water Resources Control Board
Division of Drinking Water

DRINKING WATER FIELD OPERATIONS BRANCH – MERCED DISTRICT

GUIDELINES FOR COMPLETION OF THE BACTERIOLOGICAL SAMPLE SITING PLAN

(For systems collecting four or fewer routine samples per month)

The total coliform regulation requires the water supplier to submit a bacteriological sample siting plan to the Division for review and approval. The locations where samples are to be collected must be written down and formally approved by the Division. These guidelines and Attachments B and C, "Bacteriological Sample Siting Plan" forms, are to assist you in complying with these requirements.

To comply with the requirements for submitting a Bacteriological Sample Siting Plan, two (2) items must be submitted to the Division at this time.

1. A system map, street map, or system schematic showing all sampling locations must be submitted. The map can be prepared by any system representative. It does not have to be prepared by an engineer. The following are to be shown on the map:

   - Water Sources (i.e., well or spring)
   - Treatment Facilities (i.e., chlorination)
   - Storage Tanks
   - Pressure Reducing Stations
   - Booster Stations
   - Pressure Zones
   - Dead Ends
   - Service Area Boundaries
   - Routine Sample Sites
   - Repeat Sample Sites
   - Special Sample Sites

2. Complete either Attachment B or C, the "Bacteriological Sample Siting Plan" form, and return the system map and form to the Division for review and approval. The use of either Attachment B or C depends on the number of repeat samples required. Refer to pages 2 and 3 below in "*How many repeat sampling sites are required?*"

3. Once the Bacteriological Sample Siting Plan has been approved by the Division, copies should be provided to the person responsible for sample collection, the laboratory and the person responsible for reporting coliform-positive samples to the Division.

Selection of Sampling Sites

The routine sampling sites chosen must be representative of the water distribution system including all pressure zones, areas supplied by each water source and distribution reservoir.

Looped Systems: If your entire water distribution system is looped, then one routine sample point may be representative of your system, assuming valves are open.

Pressure Zones: You should only be concerned about sampling in different pressure zones if your water system serves different areas of varying elevations, for example in mountainous areas.

How many routine sampling sites are required?

A minimum of five (5) routine sampling sites must be selected and indicated on your map and sampling plan form. If your water system is required to collect less than 5 routine samples a month, then 5 routine samples must be collected the month following any coliform positive sample. This is the reason for identifying 5 routine sites in your plan.

If the water system is not adequately represented by 5 routine sample locations, you may identify additional locations and collect more than one sample per month. Each site identified should be rotated for sampling at least every three months.

How many repeat sampling sites are required?

Either complete **Attachment B** if your system collects **one or fewer** samples per month, a repeat sample set is consists of four samples to be collected from the following locations:

- One repeat sample from the same routine location.
- One repeat sample from an *upstream location.*
  (within 5 connections of the routine site)
- One repeat sample from a *downstream location.*
  (within 5 connections of the routine site)
- One sample from *some other location.*
  (within 5 connections upstream or downstream of the routine site or a well site[see Attachment A])

or complete **Attachment C** if your system collects **more than one** routine sample per month, a repeat sample set consists of three samples from the following locations:

- One repeat sample from the same routine location.
- One repeat sample from an upstream location.
  (within 5 connections of the routine site)
- One repeat sample from a downstream location.
  (within 5 connections of the routine site)

What if the water system does not have enough locations to select the required number of routine and repeat sample sites?

If the water system does not have enough sample locations to identify 5 routine sites and 3 to 4 repeat sites per routine, you may either (1) identify fewer than 5 routine sites as long as the sampling adequately reflects water quality in the distribution system, or (2) use some of the routine sites as repeat sites for other routines (i.e., double up on use of available sites).

Pointers for Sample Site Selection

- When selecting a routine sample site you should be able to select a site upstream and a site downstream for repeat sampling.
- Select a site where the water is used continuously all year round.
- Pick a site that is easily accessible, i.e., a fenced yard with a locked gate and vicious dog is not a good selection.
- When choosing a sampling tap you should consider these factors:

The sampling tap should be located in as clean an environment as possible. It should be protected from contamination by humans, animals, airborne materials or other sources of contamination.

If you choose an outside private tap, it should be one that is in frequent use, clean, and at least 1½ feet (18 inches) above the ground. The sample tap should discharge downward.

If you choose an inside tap, be sure that you are not sampling from drinking fountains, taps which have aerators or strainers, or swivel faucets, or taps off of individual homeowner treatment units.

Do not choose a fire hydrant as sampling tap.

Avoid taps that are surrounded by excessive foliage or taps that are dirty or corroded.

Avoid taps that leak, have fittings with packing, or have permanent hoses or attachments fastened to the tap (Never collect a sample from a hose).

Avoid the use of dead ends for routine sample collection, and use for repeat samples only of no other sample sites are available and if there is continuous water use from a service off the dead-end.

Instructions for Completing the Bacteriological Sample Siting Plan Form

This form has been designed to include all the requirements for the Bacteriological Sample Siting Plan.

- **PWS Classification**

  The public water system (PWS) classification for your water system is either community, nontransient noncommunity or transient noncommunity. This classification determines the type and frequency of all water quality testing. If you are uncertain of your classification, contact the Division.

- **Month/Daily Users**

  The monthly population determines the frequency of bacteriological sample collection for community water systems. The daily population determines the frequency of sample collection for transient and nontransient noncommunity systems.

- **Active Service Connections (Community water systems only)**

  This is the number of active hook-ups served by the system. If your system has a hook-up to a vacant lot, do not count this as an active connection. If a vacant lot has a right to a future connection, do not count this an active connection. If a residence is connected to the system, but the residence is vacant, count this as an active hook-up.

- **Distribution Sampling Frequency**

  This is the minimum number of routine bacteriological samples required at the frequency specified. If any routine sample is positive for coliform bacteria, additional repeat samples will be required. Repeat samples are in addition to the required routine samples. If you are uncertain of the routine sampling frequency for your water system, contact the Division. Attachment A provides the minimum frequency based on type of water system. This will be increased if more than 1,000 people have been served on a daily basis.

  A coliform-positive sample will increase the routine monitoring for a small system the following month. A system normally collecting less than 5 routine samples per month which has a coliform positive sample must collect a minimum of five (5) routine samples the following month.

- **Source Sampling Frequency**

  This is the amount of bacteriological sampling that the water system is going to collect from each source (well, surface water-raw, spring, etc.) per month or

quarter. Source sampling is required at a specified frequency when the water system continuously treats (i.e. chlorination) the water or has a surface water treatment plant.

- **Water Treatment**

This is the type of water treatment that the water system applies to the water that is entering the distribution system. If your water system does not provide water treatment, then write N/A.

- **Trained Sampler**

The person collecting samples must be trained.

Sampling Service: Water systems utilizing a certified laboratory or other sampling service for water sample collection will be considered to have trained samplers. Enter the name of the laboratory or sampling service collecting your samples. A copy of the approved Bacteriological Sample Siting Plan should be provided to the laboratory or sampling service, if one is used.

Other Trained Samplers: Any person receiving a certificate from AWWA for attendance of the Water Sampling Training should submit a copy of their certificate along with the completed form. Any other samplers should submit a statement of their experience and training to this Division for approval.

- **Analyzing Lab**

Enter the state certified laboratory which will be analyzing your water samples.

- **Person Responsible to Report Coliform-Positive Samples to DIVISION**

This should be the person that the laboratory is required to contact when a sample is total or fecal coliform positive. This person must notify the Division within 24 hours of a violation of the total coliform standard (more than one positive sample in a month) or when any sample is fecal or *E. coli* positive. This person should have the authority to take corrective action as required by regulation and the Division. This should be the same person listed on your Emergency Notification Plan. Refer to Attachment A for additional instructions related to follow-up to positive samples. Please note: Regulation now requires the water supplier to require the laboratory immediately notify the Division of any positive bacteriological result if the laboratory cannot make direct contact with water system's designated contact person within 24 hours. We recommend you provide a copy of your emergency notification plan to your laboratory.

- **Day/Evening Phone Number**

The Division requires that the water system provide the phone numbers of the person listed above so that they can be contacted by the laboratory or the Division at any time during the day or evening in the event of a bacteriological emergency.

- **Signature and Date**

The person preparing the Sample Siting Plan should sign and date the plan. If the Division has questions regarding the sampling plan, this is the person to be contacted.

- **Sample ID**

This should be entered on the laboratory slip when the sample is turned into the laboratory. This is the unique identifier for the water sample location or the location address may also be used.

For systems collecting one or fewer routine samples per month, a minimum of five (5) routine sampling sites with three (3) repeat sampling sites for each routine sample locations must be listed. Use the **Attachment B** plan form.

For systems collecting more than one routine sample per month, a minimum of five (5) routine sampling sites with two (2) repeat sampling sites for each routine sample location must be listed. Repeat sample sites are to be located within five (5) service connections upstream and downstream of the routine sample site. Use the **Attachment C** plan form.

All sample locations should be marked in some way with the Sample ID or location address, i.e., the code painted on the sampling location or tagged with a water proof tag so the person collecting the water sample is sure to collect the water from the correct sample locations.

- **Sample Type**

This describes what type of sample (routine or repeat) is to be collected at this location.

- **Sample Point**

This is the type of the sample location. Use the following abbreviations, when appropriate.

HB	Hose Bib (exterior)
SF	Sink Faucet
PC	Goose Neck Type Copper Tube with Pet Cock

- **Location of Sample Point**

This is the description of the area in the distribution that the sample site is located. Routine sample sites shall not be located at dead ends.

DE	Dead End (Not Recommended)
PZ	Pressure Zone
RD	Representative Distribution

- **Location Address**

This is the actual physical location where the water sample is to be collected. If possible use a street address, i.e., 103 Good Street. If the location does not have a street address use the nearest crossroads or use the last name of the resident, i.e., "Brown Residence." If the location is a business, please list the business name and address.

When describing the location, keep in mind that the person collecting water samples must be able to locate the sample site from your description.

- **Months Sample Collected at This Location**

This is the schedule for routine samples to be collected. For example, suppose two (2) sites are representative of your systems. Site No. 1 will be sampled in January, March, May, July, September, and November. Site No. 2 will be sampled in February, April, June, August, October, and December. All routine sites identified should be rotated to allow sampling at least every 3 months.

ATTACHMENT A

BACTERIOLOGICAL MONITORING REQUIREMENTS
For Water Systems collecting 4 or fewer routine samples

1. Minimum Monitoring Frequency

Monthly Population Served			Service Connections			Minimum Frequency
25	to	1,000	15	to	400	1 per month
1,001	to	2,500	401	to	890	2 per month
2,501	to	3,300	891	to	1,180	3 per month
3,301	to	4,100	1,181	to	1,460	4 per month

Increased monitoring frequency may be required if there is more than one pressure zone in the distribution system or multiple sources or storage reservoirs. If your system is providing continuous chlorination treatment, closely review Item 6 below.

2. Routine and Repeat Sampling

All **routine samples** should be collected from the distribution system (not from the well) at locations specified in an approved Bacteriological Sample Siting Plan. If such a plan has not been prepared for your water system, contact the Division for assistance.

3. Repeat Monitoring After a Coliform-Positive Sample

Notification of a Coliform-Positive Sample - The water system shall require the laboratory to notify the system within 24 hours if any sample is coliform-positive. The water system must collect a repeat sample set within 24 hours of notification of the coliform-positive sample. **If the sample is fecal coliform or *E. Coli* positive, the water system should contact the Division immediately.**

Please note: Regulation now requires the water supplier to require the laboratory immediately notify the Division of any positive bacteriological result if the laboratory cannot make direct contact with the water system's designated contact person within 24 hours. We recommend you provide a copy of your emergency notification plan to your laboratory.

Repeat Sampling - *For systems collecting **only one (1)** sample per month or quarter*, a repeat sample set shall consist of four (4) samples as follows: one (1) from the routine sample site at which the positive occurred, one (1) from the upstream repeat sample site, one (1) from the downstream repeat sample site and one (1) from the operating well or another location within the system that would best help to identify the source or area of contamination.

*For systems collecting **more than one (1)** sample per month*, a repeat sample set shall consist of three (3) samples as follows: one from the routine sample site at which the positive occurred and two from the upstream and downstream repeat sample sites.

The repeat sample sites shall be located within five service connections upstream and downstream of the routine site as identified in the Bacteriological Sample Siting Plan. At least one repeat sample shall be collected from upstream and one from downstream unless there is no upstream or downstream service connection. Contact the Division as soon as the results of the repeat samples are obtained.

The following criteria should be considered when determining where to collect the fourth repeat sample:

- For systems with only one active well and do not provide continuous chlorination, the sample may be collected at the wellhead.
- For systems with more than one active well, it may not be possible to determine which well was serving the area where the positive routine sample was collected. For these systems, the fourth repeat sample should be collected at a storage tank or another point in the distribution system.
- For systems providing continuous chlorination, the system should already be conducting raw-water bacteriological monitoring at a point ahead of chlorination on at least a quarterly basis. These samples should be used to determine if the source of bacteriological contamination is from the well itself. For these systems, the fourth repeat sample should be collected at a storage tank or another point in the distribution system.
- Contact the Division for assistance.

If any of the above criteria would result in a change or revision to your existing bacteriological sample-siting plan, you must first submit a revised plan to our office for review and approval before implementing any such change or revision.

Any additional samples collected from the well(s) for investigative purposes (*not part of the repeat sample set*) should be labeled as "special" samples (or "other" samples), and will not be counted towards compliance with the monthly total coliform water quality standards.

Sampling the Month Following a Coliform-Positive Sample - If a public water system for which fewer than five routine samples/month are collected has one or more total coliform-positive samples, the water supplier shall collect at least five routine samples the following month. These samples can be collected on the same day from five different routine sites or from the same routine sites at 15 minute intervals (if fewer than five sites are available). If all five samples are negative for total coliform, the water system may return to the normal sampling frequency during the next sampling period.

4. Determining Compliance with the Coliform Standard

A public water system will fail the coliform maximum contaminant level (MCL) if: For a public water which collects fewer than 40 samples per month, at least two samples collected in the same month are coliform-positive. When this occurs, the water system representative shall contact the Division immediately (within 24-hours or the next business day if the office is closed). The water system will be required to conduct public notification and will be provided with an approved notification to be used. Public notification shall be conducted by direct mail, hand delivery or posting (where approved).

5. Monthly Reporting of Coliform Monitoring Results

The analytical results of all coliform monitoring shall be reported to the Division by the 10th day of the month following sample collection. The water system can request the laboratory to provide the results to the Division; however, the water system is ultimately responsible to ensure that the sample results were received. If the water delivered to your water system is provided with a disinfection treatment, the chlorine residual should be measured and reported at the same time and location(s) that the bacteriological sample(s) are collected. This residual must be provided to the Division on the laboratory analysis report at this time. Beginning January 1, 2004, EPA's Disinfectant/Disinfection By-Product (D/DBP) Rule will require this reporting to our Division.

6. Bacteriological Monitoring of Wells (for systems chlorinating)

Water systems that are routinely chlorinating the water supply are required to sample the raw well water for coliform bacteria. Initially, a minimum of six consecutive monthly samples must be collected from the well discharge. The samples must be collected at a location ahead of chlorination. After six consecutive monthly samples do not show the presence of coliform bacteria, the water system may request a reduction in sampling to one sample per quarter. The laboratory should be instructed to determine the most probable number of coliform (MPN) for well samples. The results of all samples shall be submitted to the Division.

ATTACHMENT B (see p. 6 of instructions)

BACTERIOLOGICAL SAMPLE SITING PLAN

System No.:	System Name:		
PWS Classification:	No. Monthly Users:	Daily Users:	
No. Active Service Connections:	Distribution Sampling Frequency: 1 sample per month		
Source Sampling Frequency: Following TC+		Continuous Water Treatment: Yes	
Name of Trained Sampler:		Analyzing Lab:	
Person responsible to report coliform-positive samples to Division		Day/Evening Phone No.:	
Signature of Water System Representative:		Date:	

Sample ID	Sample Type	Sample Point	Location of Sample Point	Address of Sample Point	Months Sample Collection at this Location
1-ROU	Routine				
1-REP1	Repeat				Repeat Sample Only
1-REP2	Repeat				Repeat Sample Only
1-REP3	Repeat				Repeat Sample Only
2-ROU	Routine				
2-REP1	Repeat				Repeat Sample Only
2-REP2	Repeat				Repeat Sample Only
2-REP3	Repeat				Repeat Sample Only
3-ROU	Routine				
3-REP1	Repeat				Repeat Sample Only
3-REP2	Repeat				Repeat Sample Only
3-REP3	Repeat				Repeat Sample Only
4-ROU	Routine				
4-REP1	Repeat				Repeat Sample Only
4-REP2	Repeat				Repeat Sample Only
4-REP3	Repeat				Repeat Sample Only
5-ROU	Routine				
5-REP1	Repeat				Repeat Sample Only
5-REP2	Repeat				Repeat Sample Only
5-REP3	Repeat				Repeat Sample Only

If the water system has one or more total coliform-positive samples, at least five routine samples will be collected the following month.

ATTACHMENT C (see p. 6 of instructions)

BACTERIOLOGICAL SAMPLE SITING PLAN

System No.:	**System Name:**	
PWS Classification:	**No. Monthly Users:**	**Daily Users:**
No. Active Service Connections:	**Distribution Sampling Frequency:**	
Source Sampling Frequency:	**Continuous Water Treatment:**	
Name of Trained Sampler:	**Analyzing Lab:**	
Person responsible to report coliform-positive samples to DIVISION:	**Day/Evening Phone No.:**	
Signature of Water System Representative:	**Date:**	

Sample ID	Sample Type	Sample Point	Location of Sample Point	Address of Sample Point	Months Sample Collection at this Location
1-ROU	Routine				
1-REP1	Repeat				Repeat Sample Only
1-REP2	Repeat				Repeat Sample Only
2-ROU	Routine				
2-REP1	Repeat				Repeat Sample Only
2-REP2	Repeat				Repeat Sample Only
3-ROU	Routine				
3-REP1	Repeat				Repeat Sample Only
3-REP2	Repeat				Repeat Sample Only
4-ROU	Routine				
4-REP1	Repeat				Repeat Sample Only
4-REP2	Repeat				Repeat Sample Only
5-ROU	Routine				
5-REP1	Repeat				Repeat Sample Only
5-REP2	Repeat				Repeat Sample Only

If the water system has one or more total coliform-positive samples, at least five routine samples will be collected the following month.

Appendix D

New Lead and Copper Monitoring Forms

State Water Resources Control Board

Division of Drinking Water

Lead and Copper Tap Sample Results Guidance Document

This guidance document was developed to help public water systems comply with the California Lead and Copper Rule (LCR). The LCR requires community water systems and non-transient non-community water systems to monitor lead and copper levels at the consumers' taps. If action levels are exceeded, installation of corrosion control treatment is required. If the action level for lead is exceeded, public notification is required.

Lead Action Level = 0.015 mg/L
Copper Action Level = 1.3 mg/L

Compliance with the lead and copper action levels is based on the 90th percentile lead and copper levels. This means that the concentration of lead and copper must be less than or equal to the action level in at least 90% of the samples collected.

To help explain compliance with the LCR, information on the following topics are included in this document:

SECTION 1. Number of Tap Sample Sites Required

The number of tap sample sites required is based on the number of people served (system size) by your water system and also whether you are performing Standard or Reduced Monitoring.

Table 1. Number of Sampling Sites

System Size	Minimum Number of Sites	
	Standard Tap Sampling	Reduced Tap Sampling
> 100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
< 101	5	5

SECTION 2. When to Sample

Samples must be collected during the months of June, July, August, or September, unless the Division approves an alternate set of four months.

Standard Monitoring:
Each water system must complete at least two consecutive 6-month Standard Monitoring periods with no exceedance of the lead or copper action level before the frequency of sampling can be reduced. During each 6-month Standard Monitoring period, you must collect at least one tap sample from the number of sites shown in Table 1, under Standard Tap Sampling.

Therefore, during your first year of sampling, collect a set of samples in the first six months and a set of samples in the second six months. Samples must be analyzed for both lead and copper.

If at any time your 90th percentile lead or copper level exceeds the action level, you must contact your respective District Office or County Agency for further guidance.

Reduced Monitoring:
If you have completed two consecutive 6-month Standard Monitoring periods and the 90th percentile levels do not exceed 0.005 mg/L for lead and 0.65 mg/L for copper, you may reduce the number of tap sample sites as shown in Table 1, under Reduced Monitoring, and reduce the frequency at which you sample to once every three years.

If you have completed two consecutive 6-month Standard Monitoring periods and the 90th percentile levels are greater than 0.005 mg/L for lead and 0.65 mg/L for copper, but do not exceed the lead or copper action levels, you may reduce the number of tap sample sites as shown in Table 1, under Reduced Tap Sampling. You may also reduce the frequency at which you collect the samples to annual monitoring for two years. Samples must be analyzed for both lead and copper.

After completing the last year of annual monitoring, if there has been no exceedance of the lead or copper action level, collect one set of samples once every three years during the month of June, July, August or September. Again, samples must be analyzed for both lead and copper.

SECTION 3. Tier Levels

Lead and copper tap samples must be collected from sampling locations that meet the following criteria:

Tier Level	Community Water Systems	Non-Transient Non-Community Water Systems
Tier 1	Single-family structures that • Contain copper pipes with lead solder installed after 1982; or • Contain lead pipes; or • Are served by a lead service line *If multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures as "tier 1" sites in its sampling pool.*	Buildings that • Contain copper pipes with lead solder installed after 1982; or • Contain lead pipes; or • Are served by a lead service line
Tier 2 *(use this tier level only if there is an insufficient number of "tier 1" sampling sites)*	Buildings (including multiple-family residences) that • Contain copper pipes with lead solder installed after 1982; or • Contain lead pipes; or • Are served by a lead service line	Buildings that • Contain copper pipes with lead solder installed before 1983
Tier 3 *(use this tier level only if there is an insufficient number of "tier 1" and "tier 2" sampling sites)*	Single-family structures that • Contain copper pipes with lead solder installed before 1983	N/A
Representative	A system with an insufficient number of tier sites shall complete its sampling pool with "representative"sites (i.e. plumbing materials commonly found at other sites) throughout the distribution system.	

Notes:
1. If lead service lines are present in the distribution system, at least half of the samples must come from the sites served by lead service lines
2. Do not sample from homes or buildings that have point-of-use or point-of-entry treatment devices (e.g., water softener, carbon filter system, etc.)
3. Each round of sampling should be conducted at the same sampling sites. If an original sampling site is not available, you should collect a tap sample from another site meeting the same Tier criteria as the original site, and complete/submit the ***Lead and Copper Tap Sampling Site Change*** form.

SECTION 4. How to Sample

Depending on the type of water system you operate, the following options are available for sample collection:

- You can collect the samples yourself using the procedures outlined below; or
- Residents of the water system can collect the samples for you. Letters are usually sent to find volunteers to participate in the sampling program. The attached sample collection instruction sheet must be sent to each participant. Residents collect the samples and complete the bottom portion of the instruction sheet. You collect the filled sample bottles and the completed instruction sheets from the residents. Sample bottles are then transported to the laboratory for analysis.

Sample Procedures:

1) Samples from residential housing are to be taken from a kitchen or bathroom cold-water faucet. Do not sample from faucets that have point-of-use treatment (e.g., water softener, carbon filter system, etc.). Samples from a non-residential building are to be collected from an interior tap from which water is typically drawn for consumption.
2) Each sample must be collected after the water has stood undisturbed in the pipes for at least 6 hours. It is best to collect the sample first thing in the morning.
3) Each sample must be one liter in volume and must contain the first water drawn from the faucet.
4) Remove the cap from the one-liter sample bottle, place the container directly below the faucet and gently open the cold-water tap. Fill the sample bottle to the line marked "1- liter or 1,000-ml" and turn off the water.
5) Tightly cap the sample bottle and complete the required information on the sample bottle label.
6) All samples must be analyzed by a laboratory certified by the State to perform drinking water lead and copper analyses.

SECTION 5. How to Calculate the 90th Percentile Lead and Copper Levels

Number of Tap Samples Collected	Determination of 90th Percentile Lead and Copper Levels
5	Place results in ascending order and assign each sample a number, 1 for the lowest concentration. Average the 4th and 5th highest sample results to get the 90th percentile level.
More than 5	Place results in ascending order and assign each sample a number, 1 for the lowest concentration. Multiply the total number of samples by 0.9. Round down to the nearest whole number if the decimal is 0.4 or lower and round up if the decimal is 0.5 or higher. The sample result that corresponds with the nearest whole number is the 90th percentile.

SECTION 6. What to Do if You Exceed the Lead or Copper Action Level

If your 90th percentile lead or copper level exceeds the action level, you must contact your respective regulating agency (District office or County Agency) for further guidance.

SECTION 7. How to Report Your Sample Results

Upon completion of each sampling period, the following items must be submitted to your respective District Office or County Agency:

- A fully completed ***Lead and Copper Tap Sample Results Reporting Form***
- A fully completed ***Lead and Copper Tap Sampling Site Change Form***, if needed
- Laboratory copies of all sample results

SECTION 8. Monitoring Waivers

You may apply to the Division for a waiver to reduce the tap sampling frequency for lead and copper to **once every nine years**. If you meet the following materials and monitoring criteria for both lead and copper, a full waiver will be granted. If you meet the materials and monitoring criteria for only one of the chemicals, a partial waiver that covers only that chemical will be granted.

Materials Criteria:

- You must provide certification and documentation that the distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, satisfy the following:

- For lead, the system must be free of plastic pipes that contain lead plasticizers or plastic service lines that contain lead plasticizers, lead service lines, lead pipes, lead-soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless you can demonstrate that such fittings and fixtures will not leach lead into the drinking water.

- For copper, the system must be free of copper pipes and copper service lines.

Monitoring Criteria:

- You must have conducted standard tap sampling for at least one six-month period and demonstrate that the 90th percentile levels for all periods of tap sampling conducted since the water system became free of all lead-containing and/or copper-containing materials do not exceed 0.005 mg/L for lead and 0.65 mg/L for copper. You must continue monitoring at the required frequency (Standard Monitoring or Reduced Monitoring) until a waiver is granted.

State Water Resources Control Board
Division of Drinking Water
Lead and Copper Tap Sample Results Reporting Form

This form must be submitted by the public water system to the regulating entity (DDW District Office or County Agency) for each round of lead and copper sampling

Report Date: (mm/dd/yyyy)	
Water System Name:	
Water System Number:	
Water System Type:	◯ Community ◯ Non-Transient, Non Community
Monitoring Frequency:	◯ 6-month ◯ Annual ◯ Triennial
# of Samples Required:	
# of Samples Reported:	
	90th Percentile Level (mg/L)
Lead: *Action Level = 0.015 mg/L*	
Copper: *Action Level = 1.3 mg/L*	

				Result	
	Sample Date	**Sample Site Location/Address**	**Tier 1, 2, 3, or R**	**Lead (mg/L)**	**Copper (mg/L)**
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Sampling Site Change

Each round of sampling should be conducted at the same sampling sites. If an original sampling site is not available, you should collect a tap sample from another site meeting the same Tier criteria as the original site.

You must complete/submit the ***Lead and Copper Tap Sampling Site Change*** form.

Notification of Results

As required by *40 Code of Federal Regulations Section 141.85(d)*, within 30 days of learning of the tap monitoring results, I notified the participants, by mailing or by another method approved by the State, of the lead sample results from their individual taps, provided an explanation of the health effects of lead, listed steps the consumer could take to reduce exposure to lead, provided contact information for the water utility, the maximum contaminant level goal for lead, action level for lead, and any definitions.

Notification was done on _____ by
(date)

☐ Direct Mail
☐ Posting in public area (NTNC systems only)
☐ Other (please specify below)

_____

For general information on lead and copper tap sampling, you can refer to the ***SWRCB Lead and Copper Tap Sample Results Guidance Document***. If you have any questions or comments, please contact your regulating entity (Division of Drinking Water District or County Agency).

SIGNATURE:	**DATE:**
NAME (Print):	**TITLE:**

Division of Drinking Water
Lead and Copper Tap Sample Results Reporting Form

	Sample Date	Sample Site Location/Address	Tier 1, 2, 3, or R	Result	
				Lead (mg/L)	Copper (mg/L)
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
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55					
56					
57					
58					
59					
60					

Division of Drinking Water
Lead and Copper Tap Sample Results Reporting Form

				Result	
	Sample Date	Sample Site Location/Address	Tier 1, 2, 3, or R	Lead (mg/L)	Copper (mg/L)
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
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99					
100					

State Water Resources Control Board

Division of Drinking Water

Lead and Copper Tap Sampling Site Change Form

Water Boards

*This form is to be completed and submitted with the **Lead and Copper Tap Sample Results Reporting Form** if any sampling site(s) are changed, with exception of the first period of tap sampling*

Water System Type: ◯ Community ◯ Non-Transient, Non-Community

	Original Sampling Site	New Sampling Site
Address/Location:		
Tier Level:	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative
Reason for sampling site change:		

	Original Sampling Site	New Sampling Site
Address/Location:		
Tier Level:	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative
Reason for sampling site change:		

	Original Sampling Site	New Sampling Site
Address/Location:		
Tier Level:	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative	◯ Tier 1 ◯ Tier 2 ◯ Tier 3 ◯ Representative
Reason for sampling site change:		

SIGNATURE:	**DATE:**
NAME (Print):	**TITLE:**

CALIFORNIA
Water Boards

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SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

September 19. 2019

System No. 2210924

Supervisor Rosemarie Smallcombe,
Mariposa County Board of Supervisors – District 1
5100 Bullion Street
Mariposa, CA 95338

Dear Supervisor Smallcombe:

RE: Expansion of the Yosemite West Service Area to Serve the YNP – Nature's Bridge Campus – Mariposa County

The purpose of this letter is to provide additional information on the impacts on the Yosemite West Water System from a potential extension of service to the NatureBridge Campus in Yosemite National Park. This letter is an extension of a letter from the State Water Resources Control Board – Division of Drinking Water (DDW) dated September 9, 2019. DDW has evaluated the usage data provided by Mariposa County. It is our understanding that the there are concerns over the County's ability to meet the demands at full buildout. In addition, the residents in the Yosemite West water system have expressed concerns over the impacts of a connection to NatureBridge. The County provided a Technical Memorandum from Provost & Pritchard Engineering Group dated August 8, 2007 (enclosed). The Technical Memorandum evaluated the anticipated wastewater and water demands for the NatureBridge Campus. The estimated demands were based on actual usage data from a similar type facility in Yosemite National Park (Crane Flat). For purposes of further determining impacts on the Yosemite West Water System resulting from a connection to NatureBridge, a full buildout demand of 7,320 gallons per day (gpd) or 5.1 gallons per minute (gpm) to serve 244 students and 20 staff will be used. Previous emails from the County indicated a higher usage at NatureBridge.

Based on information from the County, there are currently 172 active service connections and an additional 122 standby connections. The maximum day demand (MDD) usage based on 2018 usage data is estimated to be 0.314 gallons per minute per service connection (gpm/sc). The additional 122 standby connections will require an additional 38.31 gpm bringing the total system demand to 92.31 gpm. As indicated in the previous letter, the current capacity of the existing well at Yosemite West is 85 gpm. Therefore, a shortage of 7.31 gpm exists. The County will need to add additional source capacity prior to reaching full buildout of 294 service connections. Based on current building patterns, it is expected that approximately four homes are being built every year. If the current building rate continues, the County would reach 270 service connections in the approximately 24 years.

The County is considering a connection to the NatureBridge Campus and the demands for the campus (based on information presented by Provost & Pritchard Engineering Group) are estimated to be 5.1 gpm. The total demand for the Yosemite Water System is increased to 59.1 gpm. The remaining capacity (25.9 gpm) is available for future connections (standby connections). The remaining capacity can be used to serve 82 additional connections. If NatureBridge is connected to the Yosemite West Water System, the County will be able to meet demands until they approach 254 service connections. An additional 12.4 gpm would be needed to serve the existing service connections, the NatureBridge Campus and the standby users. It is expected, based on current building patterns, the County would reach 254 service connections in approximately 20.5 years.

The County will have to add additional source capacity to meet full buildout demands (294 service connections). As such, the Division recommends the County begin to plan for adding additional source capacity to the existing water system. Planning for the addition of new sources to increase the total system capacity will ensure the sustainability of the community. It is expected that the existing well and available storage will be adequate for meeting the system's needs for at least the next 20 years.

If you have any questions regarding the information contained in this letter, please contact Arnold Hatai at 559-447-3300 or by email at arnold.hatai@waterboards.ca.gov.

Sincerely,

Kassy D. Chauhan

Kassy D. Chauhan, P.E.
Senior Sanitary Engineer, Merced District
Central California Section
SOUTHERN CALIFORNIA BRANCH
DRINKING WATER FIELD OPERATIONS

Enclosure

cc: Mariposa County Public Works Department – Mr. Mike Healy
Mariposa County Environmental Health Department

Job No. 329007V1

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MEMORANDUM

To: Moose Mutlow

From: Al deHaai, Maija Madec

Subject: Yosemite Institute Wastewater Generation

Date: August 8, 2007

Yosemite Institute (YI) is proposing to relocate the environmental education campus (EEC) to the "sandlot", located west of Highway 41, east of the Yosemite West development, and south of Henness Ridge Road, in Yosemite National Park, California. The purpose of this memo is to discuss the evaluation of wastewater generation for the proposed EEC.

It is our understanding that the proposed facility will have 244 beds for 224 students and 20 staff at full occupancy. Generally only 3-4 staff members will stay overnight. The remaining staff beds are reserved for extreme weather conditions or other situations when more staff members need to stay on-site. Sessions will run from Sunday evening through Friday year round, with approximately 90 percent occupancy expected from September through the first week of June, and roughly 50 percent occupancy for the remaining months.

Full buffet style breakfast and dinner will be served daily in the kitchen facility. Lunches are sack lunches eaten in the field, which require minimal preparation. Dishes will be dry-scrubbed and then washed in a commercial dishwasher, and allowed to air dry.

Water conserving plumbing features will be used throughout the facility, including low flow showers and waterless urinals. To further conserve, there will be time restrictions on shower usage.

Normal laundry service, which generally includes linens, will be contracted out and done off-site. On-site laundry facilities will be available for occasional use in emergency situations, when bed sheets need to be washed mid-week.

The Mariposa County recommended wastewater generation rate is 70 gallons per capita day (gpcd). This rate is based on conventional plumbing fixtures, laundry, and kitchen facilities, none of which will be used at the proposed campus. With the water conserving plumbing fixtures, time limits on showers, commercial dishwasher, and only occasional use laundry facilities, it would be more appropriate to use wastewater

generation rates similar to those seen at the existing campus, which uses the same water conserving features.

Wastewater at the existing EEC facility is currently generated at about 20 gpcd. Based on the type of usage and the water conserving features used, we find it appropriate to use this generation rate with a 50 percent safety factor to estimate wastewater generation for the proposed EEC. Using a 50 percent safety factor, wastewater facilities would be designed for 30 gpcd at a full occupancy of 244 people, yielding a maximum design flow of 7,320 gallons per day (gpd). Summertime flows at half occupancy will be approximately 3,660 gpd.

Nature Bridge Environmental Education Campus at Henness Ridge

Summary of Maximum Occupancy and Estiamte Water Demand:

224 Beds for Student Lodging (8 cabins @ 28 beds each)
20 staff on campus daily (only 4 live on campus in Staff Apartments)
17 buildings including Dining Hall, 2 bath houses, 8 cabins, staff apartment and miscellaous support buildings

Peak Demand Estimate based on historical water use at Crane Flat + 50% safety factor

224 students x 30 gpc/d =	6,720	
20 staff x 30 gpc/d =	600	
Total	**7,320**	**gpd**

Appendix C: Yosemite West Well No 9 Meter Readings and Water Level Measurements, 2015-2019

County of Mariposa
Yosemite West Water Service Area
Yosemite West Well #9 - Monthly Meter Readings

Date	Gallons Produced	Static Water Level	Water Level Pump Running
Dec-19	716,000		
Nov-19	732,000		
Oct-19	983,000	41.5'	75.3'
Sep-19	1,199,000	45.7'	77.2'
Aug-19	1,456,000		
Jul-19	1,235,000		
Jun-19	1,306,000		
May-19	979,000		
Apr-19	1,180,000		
Mar-19	1,839,000		
Feb-19	1,536,000		
Jan-19	564,000		
Dec-18	772,000		
Nov-18	507,000		
Oct-18	744,000	48.4'	78.9'
Sep-18	876,000	46.7'	80.3'
Aug-18	943,000		
Jul-18	1,138,000		
Jun-18	1,074,000		
May-18	1,002,000		
Apr-18	770,000		
Mar-18	1,164,000		
Feb-18	543,000		
Jan-18	572,000		
Dec-17	705,000		
Nov-17	604,000		
Oct-17	853,000	46.8'	No Data
Sep-17	1,073,000	47.9'	85.1'
Aug-17	1,454,000		
Jul-17	1,388,000		
Jun-17	797,000		
May-17	616,000		
Apr-17	604,000		
Mar-17	611,000		
Feb-17	493,000		
Jan-17	676,000		
Dec-16	811,000		
Nov-16	1,088,000		
Oct-16	739,000	No Data	No Data
Sep-16	935,000	50.3'	78.6'
Aug-16	1,251,000		
Jul-16	1,055,000		
Jun-16	953,000		
May-16	869,000		
Apr-16	649,000		
Mar-16	691,000		
Feb-16	504,000		
Jan-16	494,000		
Dec-15	660,000		
Nov-15	530,000		
Oct-15	675,000	No Data	No Data
Sep-15	837,000	50.5'	No Data
Aug-15	1,107,000		
Jul-15	1,042,000		
Jun-15	923,000		
May-15	575,000		
Apr-15	965,000		
Mar-15	574,000		
Feb-15	486,000		
Jan-15	580,000		

Appendix D: Domestic Water Demand Evaluation for Henness Ridge – National Environmental Science Center

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Technical Memorandum

To:	Kristina Rylands, Nature Bridge
From:	Rod McNeely, PE
Subject:	Domestic Water Demand Evaluation for Henness Ridge - National Environmental Science Center
Date:	October 8, 2019

Background:

In response to your request, we prepared a detailed estimate of anticipated domestic water demand at full build-out for the new National Environmental Science Center (NESC) at Henness Ridge in Yosemite National Park. NatureBridge, formerly known as Yosemite Institute, has operated environmental education camps in Yosemite National Park for over 50 years. The camp currently operates out of their existing campus in Crane Flat and cabins in Curry Village under contract with the Park concessionaire.

The new National Environmental Science Center campus is located at the southwest corner of the intersection of Highway 41 and Henness Ridge Road. The campus will be comprised of 19 buildings, inclusive of 8 student housing cabins, 2 bathhouses, a dining hall, one classroom building, a staff building, 4 staff cabins, a maintenance building and a fire station. The campus will have a capacity to house 224 students (28 per cabin) and 4 permanent staff (three kitchen staff and 1 administrator in each of the 4 staff cabins). Additionally, there are up to 16 educators that commute daily to campus to teach, but do not reside on campus.

The project is being constructed in phases. The construction completed to date includes 2 student cabins, 1 bathhouse, staff building used as a temporary kitchen and dining hall, 3 staff cabins and the maintenance building.

Existing Water Supply:

The NESC is currently supplied with domestic water by the National Park Service through the Chinquapin water system. The system is comprised of a 1,000 ft hard rock well near the Chinquapin intersection, a water treatment room for chlorine disinfection located in the garage of the NPS Ranger residence at the Chinquapin intersection, and a distribution pipeline that serves the Chinquapin comfort station and the NESC campus. The water distribution pipeline continues uphill to two (2) 100,000-gallon water storage tanks above the NESC campus. After water is pumped into the water storage tanks, the elevation of the tanks is sufficient to pressurize the water system for the NESC and the Chinquapin comfort station.

The Chinquapin hard rock has dried up considerably since the recent California drought from the years 2011 through 2015. Due to the loss of water capacity in the Chinquapin well, additional alternatives for water supply are being explored. Current alternatives include drilling additional wells or annexation to the County of Mariposa, Yosemite West Water Service Area.

Discussion:

The purpose of this memorandum is to present a detailed estimate of anticipated domestic water demand for the built-out campus. In order to estimate water demand, we reviewed the comprehensive campus building plan set prepared by Siegel & Strain Architects and their sub consultant design team. In particular, we reviewed the plumbing plans for each building with the project architect in order to determine the campus wide domestic water fixture count.

We also interviewed NatureBridge administrative staff relative to understand their typical campus programming and operations. NatureBridge offers week-long environmental field education camps through-out the typical school year from September through May. During the school year, it is anticipated that the campus will be at or near capacity every week. The campus remains active through the summer months with specialty camps, although typically not a full capacity. During the school year, camps start on Sunday evening and conclude on Friday. On a typical day, camp operations consist of outdoor field education activities for which the students and teaching staff are off campus from 9 am to 4 pm. Campers are typical on campus for two main meals served daily. At the main Dining Hall, breakfast is typically served from 7:30 am to 8:30 am and dinner is typically be served 5:30pm to 6:30pm. Sack lunches are provided to the students daily before their off-campus endeavors.

The approach to estimating domestic water demand is based on an estimate of per capita usage of all available fixture units. It is understood that all domestic water fixture units will comply with the water saving requirements of the current California Green Building Code. The calculations for estimated domestic water demand are based on the maximum camp capacity of 224 students plus permanent staff, commuting teaching staff and estimated maximum daily occupation of the proposed fire station for the purpose of training or incident command operations. The calculations consider the transient nature of the student population being off campus for most of the school day and the permanent staff that both live and work on campus.

In addition to the water saving plumbing fixture units, the two bathhouses will implement grey water recycling from sinks and showers for re-use in toilets and urinals. However, in an effort to be conservative, the estimate assumes that only 50% of the toilet and urinal demand will be met with recycled grey water and the balance will be met with make-up domestic water for backwashing for filters or necessary make-up water if shower usage is low.

The commercial kitchen in the dining hall has the most plumbing fixtures and represents the majority of water usage on campus. We reviewed the commercial kitchen plumbing plans, equipment plans, and major kitchen equipment product cut sheets as part of our research. The estimate forecasts reasonable usage of fixtures for meal preparation and clean-up for the two main meals served daily, plus preparation of sack lunches.

The attached Figure 1 illustrates the campus wide water demand calculations based on plumbing fixtures in each building and anticipated usage based on campus population. The estimated maximum day demand is approximately 5,300 gallons per day (gpd), which yields approximately 20 gallons per capita per day (gpcpd). This estimate pair well with NatureBridge's historical average water usage of 20 gpcpd at their Crane Flat Campus.

Recommendation:

The plumbing fixture unit based calculations for the campus wide water demand are based on a series of assumptions regarding typical campus operations. One of the primary assumptions is that the typical camp field education programs have the students off-campus every day. This reduction in campus occupancy for a majority of each day directly impacts our projections of water demand from each plumbing fixture.

It is important to acknowledge that assumptions and operating conditions can vary. Even inclement weather can limit off-campus field education. Therefore, it is recommended that a factor of safety be applied to the calculated water demand of 20 gallons per capita per day (gpcpd). A factor of safety of 1.5 times the calculated water demand is recommended. For planning purposes, an estimated water demand of 30 gpcpd is recommended when the 1.5x factor of safety is applied.

FIGURE 1

ESTIMATE OF DOMESTIC WATER DEMAND FOR
NATURE BRIDGE - NATIONAL ENVIRONMENTAL SCIENCE CENTER
HENNESS RIDGE, YOSEMITE NATIONAL PARK

	# of fixtures	Uses per Fixture per Day	Gal per Use	Total Gallons
Maintenance Building				
Utility Sink	1	10	2.00	20
Mop Sink	1	4	4.00	16
Exterior Hose bib	1	5	50.00	250
Fire Station[1]				
Toilet	1	120	1.28	154
Lavoratory	1	120	0.25	30
Shower	1	10	9.00	90
Kitchen Sink	1	40	1.00	40
Exterior Hose bib	1	5	50.00	250
Staff Cabins (4)[2]				
Toilet	4	10	1.28	51
Bathroom Sink	4	20	0.25	20
Shower	4	1	10.80	43
Kitchen Sink	4	16	0.50	32
One set dedicated washer/dryer	1	2	15.00	34
Bathhouses (2)				
bottle filling station in vestibule [3]	8	28	0.50	112
Mop Sink	2	4	4.00	32
Boys[4]				
Toilet - grey water reuse[12]	8	46	1.28	234
Urinal - grey water reuse[12]	6	61	0.13	23
Sink	16	61	0.25	244
Shower	5	11	5.40	302
Girls[5]				
Toilet - grey water reuse[12]	14	52	1.28	468
Sink	10	98	0.25	244
Shower	10	6	5.40	302
Classroom				
Sink	3	20	0.50	30
Staff Building[6]				
kitchen sink	1	8	0.50	4
Toilet	2	16	1.28	41
Sink	2	32	0.25	16
shower	2	1	5.40	11
Dining Hall				
Lobby hand washing station[7]	1	448	0.25	112
Dining Hall Annex Room Sink	1	40	0.25	10
Dining Hall Coffee Maker	1	1	1.00	1
Boys Restroom				
Toilet[8]	1	40	1.28	51
Urinal[8]	1	40	0.13	5
Sink	1	80	0.25	20
Girls Restroom				
Toilet[9]	2	40	1.28	102
Sink	1	80	0.25	20
Commerical Kitchen				
Mob sink	1	10	4.00	40
Hand washing sinks	3	30	0.25	23
2 compartment prep sink[10]	1	20	10.00	200
Table with prep sink	1	120	1.00	120
Mixer fill faucet	1	20	5.00	100
Filler - Kettle & Pot	1	40	5.00	200
3 Compartment wash sinks[11]	1	10	30.00	300
Soiled Dishtable/sink	1	20	5.00	100
Commercial dishwasher	1	100	2.00	200
Ice machine	1	1	500.00	500
Downstairs				
Parent Room washer/dryer	1	4	15.00	60
wash room sink	1	40	1.00	40
Total			**gpd**	**5299**
Calculated Maximum Day Demand[13]			**gpcpd**	**20.1**

[1] Estimate assumes up to 20 fire dept. personel at building during business hours for training meeting or incident command.

[2] Estimate based on staff housing plan of 1 permanent staff member per cabin. Staff that live on campus are comprised of three kitchen staffers and one administrator. Fixture useage estimates based on staff living on campus and using kitchen for incidental meal prep, however staff eat that they prepare in the Dining Hall.

[3] Estimate assumes that the 224 students will consume 1/2 gallon per day from the 8 fill stations.

[4] Estimate assumes 3 flushes per male student or staff per day for each toilet and urinal (6 flushes total) ; 8 sink uses per person per day; 50% of students shower daily at 3 min per shower (1.8 gpm).

[5] Estimate assumes 6 flushes per female student or staff per day for each toilet and urinal; 8 sink uses per person per day; 50% of students shower daily at 3 min per shower (1.8 gpm).

[6] Sleeping quarters in staff building will be used sparingly. Sleeping quarters are only intended for instances when inclimate weather prevents teaching staff from leaving at end of work day or if staff work a late evening for an educational program. Estimate conversatively assumes 2 staff members spend the night as part of a maximum day water demand estimate.

[7] Estimate assumes each student washes hands at entry to dining hall, twice a day.

[8] Estimate assumes there will be 20 uses per meal period of both toilet and urinal and sink, twice daily.

[9] Estimate assumes there will be 40 uses per meal period of toilet and sick, twice daily.

[10] Estimate assumes 10 uses per meal period, 5 gallons each use.

[11] Estimate assumes 10 uses per meal period, 15 gallons per use.

[12] Project plumbing design includes grey water collection from sinks and showers to be re-used in toilets and urinals. Estimate conversatively assumes that 50% of toilet demand will be make-up domestic water.

[13] The total gallons per capita per day calculation is based on 224 students, 4 regular staff and 16 teaching staff.