FINAL

U.S. DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT

PRELIMINARY ENGINEERING REPORT
PROPOSED DOMESTIC WATER SUPPLY PROJECT
MANGANESE TREATMENT SYSTEM
WATER SUPPLY WELLS NO. 7 AND 8,
PHOTOVOLTAIC SOLAR ARRAY
AND PIPELINE REPLACEMENT

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AUGUST 2016

Printed on 30% post-consumer recycled material.

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1 PROJECT PLANNING

The town of Jacumba Hot Springs (previously named Jacumba) is a rural, border community of approximately 561 residents located in the southeast corner of San Diego County, California (U.S. Census 2010). Jacumba Hot Springs was designated a Colonia by the County of San Diego's Board of Supervisors on January 28, 2003 (County of San Diego 2003).[1]

The Jacumba Community Services District (JCSD) is responsible for the community's domestic water system, which currently provides service to approximately 234 homes and commercial properties. JCSD's current water supply source consists of a single active groundwater well (Well No. 4) and one standby well (Well No. 8). Well No. 4 does not have any drinking water maximum contaminant level (MCL) violations, but has a pattern of total coliform positive events. In the past decade, Well No. 4 has had a dozen positive total coliform events (CDPH 2010). Factors of Well No. 4's physical location, soil type, and lack of an adequate sanitary seal increase the potential of Well No. 4 to be groundwater under the direct influence of surface water (GWUDI). In the case of Well No. 4, the GWUDI concern is further increased because of a historic trend of pre-chlorination total coliform positive events (CDPH 2010). Because of these combined factors, California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) (formerly California Department of Public Health (CDPH)) has determined that Well No. 4 is most likely GWUDI, and therefore must meet the requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2). Well No. 8 is completed in a fractured rock aquifer underling the shallow alluvium that is not GWUDI. Well No. 8 water quality exceeds the California drinking water secondary MCL for manganese. Well No. 8 has a manganese concentration of 196 micrograms per liter (µg/l) that is above the secondary MCL of 50 µg/l, and requires a manganese filtration/treatment facility, including an automatic filter backwash system and backwash water evaporation pond, to ensure a good quality source of domestic water supply for the community. The future domestic water system back-up supply source (Well No. 7) has a water temperature of approximately 84 degrees Fahrenheit (°F) and will potentially be used as a backup source of supply for Well No. 8.[2]

[1] The USDA defines colonias as 'any identifiable community designated in writing by the State or county in which it is located; determined to be a colonia on the basis of objective criteria including lack of potable water supply, lack of adequate sewage systems, and lack of decent, safe, and sanitary housing, inadequate roads and drainage; and existed and was generally recognized as a colonia before October 1, 1989'PART 1777—§ 306C WASTE WATER DISPOSAL LOANS AND GRANTS [62 FR 33473, June 19, 1997, as amended at 69 FR 65519, Nov. 15, 2004].

[2] Temperature recorded in Well No. 8 is approximately 78 °F whereas the temperature recorded in Well 7 is approximately 86 °F. Well 7 in particular contain fractures that are in contact with thermal water. Well MW-3, in the immediate vicinity of Wells No. 7 and 8, is relatively cool at 63 °F because it is shallow and influenced by the Boundary Creek alluvial aquifer (Petra 2009).

The JCSD currently has two inactive wells (Wells No. 3 and No. 5) and two abandoned wells (Wells No. 1 and No. 2). Records for all four of these wells sites indicate that these wells were not abandoned in accordance with Department of Water Resources (DWR) Bulletins 74-81 and 74-90. JCSD has been directed by DDW to submit a plan for the destruction of Wells No. 1, 2, 3, and 5 in accordance with Bulletins 74-81 and 74-90.

The development of Well No. 8 included the installation of a 40 HP submersible pump and motor and a masonry block pump-house with electric heaters, fan chlorination pump, well pump telemetry control system, pump motor soft starter, lighting, and telemetry alarm system (alarm light, auto-dial-out). These components combined with the proposed manganese treatment system will significantly increase the annual operating and maintenance (O&M) costs of the JCSD. In order to partially offset the increased O&M costs, it is proposed to install a photovoltaic (PV) solar array grid-tie system.

The JCSD is applying for funding assistance from the U.S. Department of Agriculture (USDA) Rural Development Rural Utilities Service (RUS) Water & Waste Disposal (WWD) Loan & Grant Program, and the Colonia Grant Program, to improve the quality of the existing domestic water supply and to reduce a portion of the annual operating costs (electrical costs) for the existing domestic water system.

1.1 Location

The community of Jacumba Hot Springs is located in the southeast corner of San Diego County, approximately 5 miles west of the border with Imperial County and 0.25 miles north of the international border with Mexico. Old Highway 80 runs east-west through the community and Interstate 8 is located approximately 2 miles to the north. Refer to Figure 1 for a Regional Location Map. Figure 2 provides the USGS 7.5 minute Jacumba Quadrangle Topographical Map as a base map and shows the location of the existing JCSD facilities. Figure 3 provides aerial photography as a base map and shows the existing JCSD facilities and JCSD owned land in the area of the existing facilities. Figure 4 provides aerial photography as a base map and shows the existing and tentative site layout for the Manganese Treatment System Wells No. 7 and 8.

1.2 Environmental Resources Present

An Environmental Report (ER) compliant with "RUS Environmental Bulletin 1794A-602 California RUS Environmental State Supplement" (State Supplement) and categorical exclusions under § 1970.54 will be required due to the location and construction of the proposed ground-mounted PV solar array grid-tie system and the new backwash evaporation pond. To meet the State Supplemental requirements, a biological resources survey, archeological resources survey

including AB-52 Tribal outreach and State Historic Preservation Officer (SHPO) consultation is being prepared by Dudek.

1.3 Population Trends

The population and number of homes within the Jacumba community are stable at the present time with very minimal growth expected in the foreseeable future. Presently, Jacumba is an attractive community for holiday retreats and retirement because of the dry high desert air, quiet surroundings and slow pace of life. The Jacumba Hot Springs Spa & Resort attracts tourist traffic to the community which helps support the local economy. Approximately 50% of the community's population is retired, consequently, there is a general lack of labor available to support any extensive local growth. Organic produce farming was the primary agricultural activity in Jacumba until the closure of Bornt Farms in about 2013. Cattle ranching has historically occurred from the Jewell Valley area to the west and the Jacumba Valley area to the east of Jacumba Hot Springs.

Future residential growth of the Jacumba community will likely be in-fill housing within the current footprint of the community rather than the result of radial expansion of the existing residential areas. The County of San Diego General Plan, which directs future growth in the unincorporated areas of the County, has emphasized growth in the western portions of the unincorporated County rather than the eastern backcountry areas. At this time, there is no expectation of future large-scale buildout of the Village area land use designated for Jacumba Valley Ranch. Areas surrounding Jacumba Hot Springs are designated rural or semi-rural with limited expected growth. Table 1 lists the historical population numbers for Jacumba Hot Springs.

Table 1
Historical Population

Year	Population
1990	500[a]
2000	582
2010	561
Estimated Annual Growth Rate[b]	**0.61%**

Notes:

[a] Jacumba Hot Springs (previously Jacumba) was not a census designated place in 1990. Thus, population data from the US Census for 1990 is not available. Swenson (1981) reported a population of about 400 around 1980. A population of 500 was assigned to 1990 to estimate the 20 year annual growth rate.

[b] Annual growth rate = ((Present Value – Past Value)/ Past Value)) x100 = Growth Rate /Years (N) = Annual Growth Rate, N = 20.

1.4 Community Engagement

The Project has been presented at previous JCSD Board meetings for the initial phase that included well drilling and equipping. Periodically, information about Project status has been

presented at JCSD Board meetings. A project update was presented at the June 2016 regular Board meeting and at public meeting to be held on August, 16 2016. Once project funding is secured, Project updates will be provided to the community on a regular basis through Board meetings and informational flyers. A Proposition 218 vote, the so-called "Right to Vote on Taxes Act" is required in order to increase water rates. At this time, a rate increase is expected for fiscal year 2016/2017 but would not include any fixed costs for capital improvements included in this project.

2 EXISTING FACILITIES

The existing domestic water supply, storage, distribution, and fire protection systems and facilities of the JCSD were upgraded by rehabilitation projects completed in March 2006 and October 2010, which included the construction and development of Well No. 8 (JCSD's future primary source of domestic water supply), the construction of Well No. 7 (an inactive well and future potential source or backup source for the JCSD), a second domestic water storage tank, replacement and upsizing of a substantial portion of the JCSD's distribution system piping, installation of a fire pump, construction of a new booster pump station with back-up emergency generator, the removal of deteriorated water service laterals and flush hydrants, the installation of new water service laterals and the installation of new fire hydrants on upsized distribution lines to improve community fire protection.

2.1 Location Map

Figure 2 provides the USGS 7.5 minute Jacumba Quadrangle Topographical Map as a base map and shows the location of the existing JCSD facilities including main water transmission lines, booster station, water tanks, water wells and fire hydrants. Figure 3 provides aerial photography as a base map and shows the existing JCSD facilities and JCSD owned land in the area of the existing facilities. Figure 3 also shows the location of parcels in a separate pressure zone served by the pressure booster station.

2.2 History

A history of the water system components is provided in Table 2.

Table 2
System History

System Component	Name	Year Constructed	Year(s) Renovated	Description of Renovation
Water Source(s)	Well No. 1		Not in Service	
	Well No. 2		Not in Service	
	Well No. 3		Not in Service	
Current Primary Production Well	Well No. 4	mid 1950s	June 2016	Well liner. Motor recently replaced.
	Well No. 5		Not in Service	
Non-potable[a]	Well No. 6	2003	Non-potable	
	Well No. 7	2008	Not Permitted	
Stand-by Well	Well No. 8	2008		
Treatment Plant				
Storage	Tank No. 1			
	Tank No. 2			

Table 2
System History

System Component	Name	Year Constructed	Year(s) Renovated	Description of Renovation
Pipeline				
Pump Station(s)	Booster Station	2007		

Notes:
[a] On October 3, 2013, the JCSD officially requested to the DDW that Well No. 6 be converted form a domestic well to an agricultural well (JCSD 2013). On October 8, 2016, the DDW approved disconnecting Well No. 6 from the potable distribution system (CDPH 2013).

2.3 Condition of Existing Facilities

2.3.1 Groundwater Supply

The JCSD relies solely on groundwater as a source of water supply. At present, there is one existing domestic water supply well in use within the JCSD, the primary well (Well No. 4). A monitoring well (MW-3) and Well No. 7 and 8 were drilled in 2008. Well No. 7 has been proposed as an emergency back-up well to Well No. 8. All four well sites are located in the western portion of the JCSD to the north of Old Highway 80, near Boundary Creek. Well No. 8 is an approved standby raw water source by the DDW provided manganese treatment (CDPH 2013). Currently, Well No. 8 shall not be used more than 15 days a year or more than 5 consecutive days per the limitations of use in conformance with Title 22, CCR Section 64414(c) (CDPH 2013). A new 6-inch polyvinyl chloride (PVC) pipe well transmission line was constructed in 2010 through a USDA grant, from the Well No. 8 site to connect to the existing 6-inch ductile iron pipe (DIP) transmission line from Well No. 4 to the water storage tanks. Well No. 4 is operated by a telemetry system based on the water level in the storage tanks. The telemetry system was installed as part of the new storage tank construction project in 2005 and telemetry was also installed at Well No. 8 as part of the construction project in 2010.

Well No. 8 will become the primary well used by the JCSD for the community's water supply needs. Well No. 8 is located approximately 1,440 feet southwest of S. Railroad Street and 115 feet northwest of Old Highway 80. The well was drilled in 2008. The diameter of the well casing is 12 inches, the total depth of the well is 524 feet, and the well has a sanitary (annular) seal to a depth of 133 feet (Petra 2009). A 40 HP submersible well pump and motor currently produces approximately 100-155 gallons per minute (gpm), and is in operating condition.

Well No. 4 is the current primary well for the JCSD and in the future will be used only as a secondary back-up well. Well No. 4 is located approximately 280 feet southwest of S. Railroad Street and 105 feet northwest of Old Highway 80. The well was drilled in the mid-1950s. The diameter of the well casing is 15 inches, the total depth of the well is approximately 40 feet, and the well has a 10 foot sanitary seal, which poses a health concern, especially during times of

heavy rains. A 10 HP submersible well pump and motor currently produces approximately 180 gpm, and is in good operating condition. The State of California, Department of Public Health issued a Sanitary Survey Report in 2010 that indicated that Well No. 4 is most likely GWUDI (CDPH 2010).

MW-3 was drilled in August 2007 on private property located north of Old Highway 80 at the western most limit of the JCSD boundary, and adjacent to the site where Well No. 8 and Well No. 7 are located. MW-3 is located approximately 200 feet northwest of Well No. 8, approximately 250 feet northwest of Well No. 7 and approximately 315 feet northwest of Old Highway 80. MW-3 is a bedrock well with approximately 22 feet of alluvial material above fractured granitic rock. MW-3 produces water of good quality. However, after several attempts to develop MW-3, only 11 to 15 gpm was produced with a low specific capacity. During the capacity testing for Well No. 8 and Well No. 7, it was determined that MW-3 is fed by a different aquifer than Wells No. 8 and No. 7 (Petra 2009).

Well No. 7 was drilled in 2008 to be the JCSD's emergency back-up well for the domestic water supply. Well No. 7 is located approximately 65 feet south of Well No. 8, 70 feet northwest of Old Highway 80, and approximately 365 feet southeast from Boundary Creek. The diameter of the well casing is 12 inches, the total depth of the well is 518 feet, and the well has a sanitary seal to a depth of 83 feet (Petra 2009). The well was partially developed in January 2009, however, was not placed into production because of high water temperatures near 84 °F. Well No. 7 is proposed to be developed as the domestic water supply back-up for Well No. 8 and a replacement for Well No. 4.

Well No. 4 is located inside a small fenced area that includes a wooden shed, which houses the electrical controls, telemetry equipment, and hypo-chlorination system. A sodium hypochlorite injection system is used to disinfect the well water at the well site. Water quality testing over the past several years indicates compliance with California MCLs for organic chemicals, inorganic chemicals, general minerals, and radio-nuclides. Subsequent to the April 2010 earthquake, high turbidity and color levels were detected in water samples tested from May 19 until May 28, 2010, at which point the turbidity and color levels dropped below the MCLs. With respect to total coliform, Well No. 4 had two positive total coliform tests prior to chlorination from 2009 to 2012 and over a dozen positive total coliform positive results since 2001 (CDPH 2010, 2013).

Well No. 8 and Well No. 7 are each located inside barbed wire chain link fences. The fenced area for Well No. 8 includes a masonry block pump-house, which houses the well pump electrical controls, telemetry equipment, hypo-chlorination system, and emergency electrical generator transfer switch. Table 3 lists information pertaining to the groundwater supply wells and their current status.

Table 3
Groundwater Supply Wells

Number/ Name	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8
Status	Abandoned	Abandoned	Inactive	Primary Source	Inactive	Non-potable	Inactive	Emergency backup
Pumping/ Flow Rate (gpm)				180[a]		600[b]	200[b]	100-155[c]
Pump Motor Size (HP)	N/A	N/A	N/A	10	7.5		N/A	40
Pump Depth (ft)	N/A	N/A	N/A	33.6	N/A		N/A	440
Well Depth (ft)	124	140	50?	40	42	465[a]	518	518
Well Capacity (gpm)	N/A	N/A	N/A	200	180	600	200	200
Well Casing Material	steel	steel	steel	steel	steel	steel	PVC	PVC
Well Casing Diameter	14-inch	12-inch	N/A	15-inch	10-inch	8-inch	8-inch	8-inch
Age (yrs)	60	52	49	60	N/A	13	8	8
Regulatory Contaminants	N/A	N/A	N/A	coliform	N/A	odor, fluoride, toluene	N/A	manganese

Notes:

[a] Well No. 4 was pump test at 200 gpm. The current production rate is 180 gpm given the current total dynamic head (i.e., lower pumping water level due to current drought decreases the pumping capacity of the well).

[b] Well No. 6 was pump tested at a rate of 600 gpm. Well No. 6 is constructed with casing to 150 feet below ground surface. Below that depth the well is an open borehole in the fractured rock.

[c] Well No. 7 and Well No. 8 were pump tested concurrently at a production rate of 200 gpm each. 155 gpm is the current capacity of the submersible pump and motor at the design total dynamic head.

Well Nos. 1, 2, 3, and 5 should be destroyed as per the DDW requirements. Well No. 4 is in poor condition and a 6-inch PVC well liner and filter pack is being installed into the well in June 2016 to extend the remaining life of the well. Well No. 6 is in working condition but used solely for non-potable supply and is no longer part of the domestic water distribution system due to elevated temperature (94 °F) and fluoride concentrations above the California drinking water MCL. Well Nos. 7 and 8 appear to be in good condition. Only Well No. 8 is equipped with a submersible motor and pump.

The hydrogeologic units in the vicinity of Wells No. 7 and 8 consist of the following:

Alluvium: The depth of the alluvium at Wells No. 7 and 8 is up to 42 feet. Alluvium fills the narrow channel associated with Boundary Creek and varies in width and thickness along the course of the creek. Alluvial thickness ranges from 10 to 42 feet for wells in the vicinity of the project (Table 4).

Decomposed Granite (DG): Decomposed granite (DG), ranging from 5 to 13 feet in thickness, was observed in wells drilled in the vicinity of the project (Table 4).

Granitic Bedrock: The crystalline bedrock is predominantly composed of granodiorite with tonalite outcrops present throughout the watershed. Extensive fractures were logged up to a depth of 524 feet while drilling Wells No. 7 and 8.

Table 4
Well Descriptions

Well Number	Well Completion Depth (feet bgs)/ (Year Drilled)	Depth to Water (feet btoc);date	Approximate Production Capability (gpm)	Alluvium/ Residual Soil (feet bgs)	Decomposed Granite (DG) (feet bgs)	Fractured Granite (feet bgs)
JCSD Wells						
MW-3	--	25.06; 11/2015	11-15	0-31	--	--
Well 4	39[c] (1955)	9.92; 8/2014	180[a]	0-39[b]	--	--
Well 6	462 (2003)	3.17; 8/2014	600+	0-35	35-40	40-465
Well 7	518 (2008)	30.14; 12/2015	200	0-10	10-23	23-520
Well 8	518 (2009)	30.00; 8/2014	200	0-42	42-55	55-524

Notes:
[a] Current production rate.
[b] Alluvial depth based on total depth of Well 4.
[c] Approximate completion depth

As discussed in Sections 1 and 2, the alluvial aquifer in the vicinity of Boundary Creek is most likely GWUDI and must meet requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2). While the alluvium in the vicinity of Boundary Creek currently supplies the community, it no longer is viewed as a long term source. The fractured granite aquifer consists of water that is thermally influenced to varying degree. Temperature recorded in Well No. 8 is approximately 78 °F whereas the temperature recorded in Well No. 7 is approximately 86 °F. By comparison, Well No. 6 completed in the fracture rock aquifer is heavily thermally influenced with a temperature of 94 °F and Well MW-3 is relatively cool at 63 °F because it is shallow and influenced by the Boundary Creek alluvial aquifer (Petra 2009). The useful depth of the fractured rock aquifer in the vicinity of the project is about 500 feet below ground surface due to the high potential to encountered thermal water below this depth.

Water quality issues associated with the alluvial aquifer includes repeated total coliform positive events. Water quality issues/contaminants with the fractured rock aquifer include elevated temperature, manganese, and fluoride concentrations.

2.3.2 Standby and Emergency Supply

Well No. 8 is an emergency use only back-up well for the JCSD that is currently the only permitted back-up well with SWRCB's DDW. Well No. 7 and Well No. 4, as described above, will be used only as secondary back-up wells in the future once the Well No. 8 treatment system comes online. JCSD is solely reliant on groundwater for supply and besides the groundwater wells there is no other connection sources. The water supply capacity includes Well No. 4 rated at 200 GPM and 635,000 gallons of storage tank capacity.[3] These two elements provide the system with a total source capacity of 923,000 gallons per day (CDPH 2013).[4]

2.3.3 Storage

Domestic water storage for the JCSD is provided by a 200,000 gallon bolted steel water storage tank, and a 435,000 gallon bolted steel water storage tank. Both storage tanks are located atop a hill within the southwest portion of the community services district approximately 650 feet north of the international border with Mexico. The 200,000 gallon water storage tank measures approximately 38 feet in diameter and 24 feet in height. The tank was constructed in 1994 at a finish floor elevation of 2,914.8 feet, under a project funded by the U.S. Department of Housing and Urban Development (HUD).

The 435,000 gallon water storage tank measures approximately 58 feet in diameter and 22 feet in height. The tank was constructed in 2007 at a finish floor elevation of 2,917.0 feet on the site of the 160,000 gallon stone and concrete reservoir that was demolished in 2007. The 435,000 gallon water storage tank was constructed under a grant funded by the USDA. A summary of the system storage is provided in Table 5.

Table 5
System Storage

Reservoir/Tank No.	1	2
Storage Capacity (gallons)	200,000	435,000
Elevated or on-grade	elevated	elevated
Material	steel	steel
Construction type	bolted	bolted
Age (years)	22	9

[3] The current production rate for Well No. 4 is 180 gpm due to declining water levels and increased total dynamic head resulting from the current drought.

[4] CDPH reports the storage tanks are 0.24 million gallon and 0.43 million gallon tanks and total storage of 670,000 gallons. This evaluation indicates the tanks are 200,000 gallons and 435,000 gallons for a total storage capacity of 635,000 gallons.

The system storage tanks are in good condition with no immediate repairs or maintenance required.

2.3.4 Regulatory Capacity

The Maximum Day Demand (MDD)[5] estimated for this system is 210,000 gallons based on the maximum reported water use that occurred in August 2007 (CDPH 2010). Peak Hour Demand (PHD) estimated for this system is 13,125 gallons per hour (gph) (CDPH 2010).[6]

2.3.5 Water Supply Capacity Evaluation

The number of water service connections is 234 existing connections. The MDD is 210,000 gallons (CDPH 2010) and the total storage is 635,000 gallons. As the system has less than 1,000 service connections, the system meets Title 22 requirements to have storage capacity equal to or greater than MDD. The water supply system does not have any capacity regulatory violations.

2.3.6 Water Quality

Well No. 4 does not comply with the Federal Long Term 2 Enhanced Surface Treatment Rule (LT2). Positive total coliform events that have historically occurred at Well No. 4 are discussed further in Section 3.1. A summary of water quality results for Wells No. 7 and 8 are provided in Tables 6 and 7.

Table 6
Well No. 7 Water Quality

Constituent	Analytical Method	Groundwater Well 7 Result, Sampled Feb. 2, 2009	Units
Cations			
Hardness	SM3120B	330	mg/l
Calcium	EPA 200.7	101	mg/l
Magnesium	EPA 200.7	18.8	mg/l
Sodium	EPA 200.7	74.1	mg/l
Anions			
Total Alkalinity	SM2320B	128	mg/l
Bicarbonate Alkalinity	SM2320B	156	mg/l
Carbonate Alkalinity	SM2320B	< 1	mg/l
Hydroxide Alkalinity	SM2320B	< 1	mg/l

[5] Maximum day demand (MDD) means the amount of water utilized by consumers during the highest day of use (midnight to midnight), excluding fire flow, as determined pursuant to Section 64554. For systems with less than 1,000 service connections, the system shall have storage capacity equal to or greater than MDD, unless the system can demonstrate that it has an additional source of supply or has an emergency source connection that can meet the MDD requirement.

[6] Determine the average hourly flow during MDD and multiply by a peaking factor of at least 1.5 to obtain the PHD (210,000 gallons/ 24 hours x 1.5 = 13,125 gph). Title 22 – California Waterworks Standards.

Table 6
Well No. 7 Water Quality

Constituent	Analytical Method	Groundwater Well 7 Result, Sampled Feb. 2, 2009	Units
Chloride	EPA 300.0	170	mg/l
Sulfate	EPA 300.0	215	mg/l
Nitrate (as NO_3)	EPA 300.0	< 2	µg/l
Fluoride	EPA 300.0	0.43	mg/l
Aggregate Properties, General Physical and MBAS			
Color	SM2120B	<3	units
Odor Threshold @ 60 C	SM2150	<1	TON
Turbidity, Laboratory	SM2130B	0.35	NTU
pH	EPA 150	7.6	units
Total Dissolved Solids	SM2450C	651	mg/l
Specific Conductance	SM2510B	1120	µS/cm
MBAS	SM5540C	< 0.05	mg/l
General Metals and Inorganics			
Aluminum	EPA 200.8	< 30	µg/l
Arsenic	EPA 200.8	< 2	µg/l
Barium	EPA 200.8	< 1000	µg/l
Cadmium	EPA 200.8	< 1	µg/l
Copper	EPA 200.8	< 5	µg/l
Iron	EPA 200.7	124	µg/l
Lead	EPA 200.8	< 4	µg/l
Manganese	EPA 200.7	27	µg/l
Mercury	EPA 200.8	< 0.2	µg/l
Selenium	EPA 200.8	< 5	µg/l
Silver	EPA 200.8	< 5	µg/l
Total Chromium	EPA 200.8	< 1	µg/l
Zinc	EPA 200.8	18	µg/l
Carbamates			
Carbamates by Method EPA531.1	EPA531.1	ND	µg/l
Gross Alpha and Beta Radionuclides and Radium			
Radioactivity, Gross Alpha	SM7110B	3.09	pCi/l
Radioactivity, Gross Beta	SM7110B	10.5	pCi/l
Radium 226	EPA903.0	0.713	pCi/l
Radium 228	EPA Ra5	1.11	pCi/l
Uranium	EPA200.8	< 0.67	pCi/l
Herbicides			
Herbicides by Method EPA515.1	EPA515.1	ND	µg/l
Pesticides			
Pesticides by Method EPA505	EPA505	ND	µg/l
SVOCs			
SVOCs by Method EPA525.2	EPA525.2	ND	µg/l

Table 6
Well No. 7 Water Quality

Constituent	Analytical Method	Groundwater Well 7 Result, Sampled Feb. 2, 2009	Units
VOCs			
VOCs by Method EPA502.2/524.2	EPA502.2/524.2	ND	µg/l

Table 7
Well No. 8 Water Quality

Constituent	Analytical Method	Sample Date	Groundwater Well 8 Result	Units
Cations				
Hardness	SM3120B	2/27/2009	366	mg/l
Calcium	EPA 200.7	2/27/2009	113	mg/l
Magnesium	EPA 200.7	2/27/2009	20.4	mg/l
Sodium	EPA 200.7	2/27/2009	68	mg/l
Anions				
Total Alkalinity	SM2320B	2/27/2009	130	mg/l
Bicarbonate Alkalinity	SM2320B	2/27/2009	159	mg/l
Carbonate Alkalinity	SM2320B	2/27/2009	< 1	mg/l
Hydroxide Alkalinity	SM2320B	2/27/2009	< 1	mg/l
Chloride	EPA 300.0	2/27/2009	165	mg/l
Sulfate	EPA 300.0	2/27/2009	253	mg/l
Nitrate (as NO_3)	EPA 300.0	12/2/2015	< 0.05	mg/l
Fluoride	EPA 300.0	2/27/2009	0.39	mg/l
Aggregate Properties, General Physical and MBAS				
Color	SM2120B	5/12/2010	< 3	units
Odor Threshold @ 60 C	SM2150	5/12/2010	< 1	TON
Turbidity, Laboratory	SM2130B	5/12/2010	0.89	NTU
pH	EPA 150	2/27/2009	7.62	units
Total Dissolved Solids	SM2450C	2/27/2009	715	mg/l
Specific Conductance	SM2510B	2/27/2009	1157	µS/cm
MBAS	SM5540C	2/27/2009	< 0.05	mg/l
General Metals and Inorganics				
Aluminum	EPA 200.8	2/27/2009	< 30	µg/l
Arsenic	EPA 200.8	2/27/2009	< 2	µg/l
Barium	EPA 200.8	2/27/2009	36	µg/l
Cadmium	EPA 200.8	2/27/2009	< 1	µg/l
Copper	EPA 200.8	2/27/2009	< 5	µg/l
Iron	EPA 200.7	2/27/2009	27	µg/l
Lead	EPA 200.8	2/27/2009	< 4	µg/l
Manganese	**EPA 200.7**	**2/27/2009**	**196**	**µg/l**
Mercury	EPA 200.8	2/27/2009	< 0.2	µg/l
Selenium	EPA 200.8	2/27/2009	< 5	µg/l

Table 7
Well No. 8 Water Quality

Constituent	Analytical Method	Sample Date	Groundwater Well 8 Result	Units
Silver	EPA 200.8	2/27/2009	< 5	µg/l
Total Chromium	EPA 200.8	2/27/2009	< 1	µg/l
Zinc	EPA 200.8	2/27/2009	36	µg/l
Carbamates				
Carbamates by Method EPA531.1	EPA531.1	2/27/2009	ND	µg/l
Gross Alpha and Beta Radionuclides and Radium				
Radioactivity, Gross Alpha	SM7110B	2/27/2009	3.55	pCi/l
Radioactivity, Gross Beta	SM7110B	2/27/2009	10.4	pCi/l
Radium 226	EPA903.0	2/27/2009	1.07	pCi/l
Radium 228	EPA Ra5	2/27/2009	0.361	pCi/l
Uranium	EPA200.8	2/27/2009	< 2.0	pCi/l
Herbicides				
Herbicides by Method EPA515.1	EPA515.1	2/27/2009	ND	µg/l
Pesticides				
Pesticides by Method EPA505	EPA505	2/27/2009	ND	µg/l
SVOCs				
SVOCs by Method EPA525.2	EPA525.2	2/27/2009	ND	µg/l
VOCs				
Chloroform	EPA502.2/524.2	2/27/2009	0.9	µg/l
Total Trihalomethanes	EPA502.2/524.2	2/27/2009	0.9	µg/l

Notes: Bold text denotes exceedance of drinking water MCL.

Well No. 8 exceeds the secondary MCL for manganese (50 µg/l) at a concentration of 196 µg/l. Water treatment currently required for the system is limited to chlorination.

2.3.7 Pipeline

The existing water distribution system is a conglomeration of 4-inch, 6-inch, 8-inch, and 10-inch water lines composed of PVC (C-900), asbestos cement (AC), and ductile iron pipe (DIP). As a whole, the distribution system consists of approximately 2,800 feet of 10-inch pipe, 1,250 feet of 8-inch pipe, 16,500 feet of 6-inch pipe, and 9,700 feet of 4-inch pipe. Refer to Figures 2 and 3 for a schematic layout of the existing distribution system. System improvements have recently been constructed as-needed, with previous significant improvement projects occurring in the mid-1960's and again in 2007-2008. JCSD has not recently estimated leakage from the distribution system. All alley ways need concrete/transite water mains replaced from Heber Street east to Campo Street and along Seeley Avenue (Figure 6). The 4-inch dimeter pipelines require replacement due to age and reoccurring failure as a result of root damage. Additionally, several sections of the existing pipeline were not installed to a sufficient depth and are periodically damaged due to large vehicle traffic (e.g. trash trucks) in the alley ways. In total,

approximately 6,038 linear feet of 4-inch pipeline needs to be replaced. Frequent repairs required to fix the 4-inch concrete/transite pipeline has potential to introduce bacterial contamination into the water distribution system and presents a health and sanitary issue. There are two pressure zones within the distribution system. The majority of the service area relies on gravity flow from the existing water storage tanks, which provides approximate static pressures ranging from 34-60 psi throughout the community, and estimated maximum day use pressures ranging from 45-56 psi. Water from the water storage tanks flows to the community through a backbone 6-inch PVC pipe water supply line. Within the main portion of the community, north-south water supply lines are 6-inch PVC and 8-inch PVC pipe, while the east-west waterlines are typically 10-inch PVC pipe. The majority of the water service lines are connected to the east-west running waterlines.

There are approximately three existing 2-inch and 4-inch flush hydrants, and 46 existing 6-inch fire hydrants located throughout the distribution system. There are a total of nine existing water sampling stations at random locations throughout the distribution system.

2.3.8 Pump Stations

Approximately 10 homes and the elementary school are on an elevated pressure zone, which is pressurized by a booster pump station (Figure 3). The booster pump station was constructed in 2007 as a part of the Phase 1 domestic water rehabilitation project funded by the USDA. The booster pump station site is enclosed inside of a barbed wire chain link fence, and consists of a 17 feet x 28 feet metal shade Ramada, duplex variable speed 7.5 HP centrifugal booster pumps, 75 HP horizontal centrifugal fire pump, 100 kW emergency generator as back-up source for electric power to the booster pumps and fire pump, and electrical control panels. The booster pumps are capable of producing approximately 300 gpm at residual pressures ranging from 59 psi to 70 psi within the elevated pressure zone. The fire pump is capable of producing approximately 2,000 gpm. The fire pump turns on at 37 psi with a maximum of 110 psi within the elevated pressure zone. The waterlines in the upper zone are 6-inch and 8-inch PVC pipe. The pump station is in good condition and currently adequate to meet system requirements.

2.3.9 Water Meters

There are currently 234 domestic and commercial connections with water meters and no connections without water meters. There are two potable supply water wells with production water meters and no wells without water meters. A Sensus 4-inch turbine digital flow meter is installed on Well No. 8 and was new when installed as part of as part of the USDA project in 2010 and is in working condition. A totalizing flow meter is installed on Well No. 4 and was rebuilt in March 2016. It is in excellent condition. The age, type and condition of the domestic and commercial meters differ. The age ranges from approximately 40 years to brand new. All are in good, working condition. All residential and commercial meters are manually read monthly.

2.3.10 SCADA System

Well No. 4 is operated by a telemetry system based on the water level in the storage tanks. The telemetry system was installed as part of the new storage tank construction project in 2005 and telemetry was also installed at Well No. 8 as part of the construction project in 2010.

The AGM Electronics Data Connectivity System and Sensaphone® 800 Remote Monitoring System installed in 2010 at Well No. 8 has been problematic. The equipment is outdated and not easily serviceable by local vendors. JCSD was recently quoted $6000.00 to have it fixed. The Well No. 8 SCADA system is proposed to be replaced as part of the Well No. 8 upgrades.

2.3.11 Other System Management Issues

JCSD only provides wellhead chlorination; therefore JCSD is not required to comply with the Certified Treatment Operator regulations. In accordance with § 64413.3(a)&(b), due to the population served (less than 1,000), JCSD is classified as a D1 distribution system. JCSD has one employee with a D-1 license to meet the D-1 requirement. It is noted that a certified treatment operator will be required to meet operational requirements of the proposed project.

Control Valves: The valves along Campo Street need to be replaced, 6 valves total.

Security issues: Wells No. 4 and No. 6 need a perimeter fence for security purposes.

Other issues: Well No. 6 (non-potable well) needs controls. Decommission Wells 1, 2, 3 and 5 as per DDW requirement.

2.4 Financial Status of Existing Facilities

2.4.1 Current Annual Income and Rate Structure

JCSD's current annual income is approximately $94,000. Current users include residential, commercial and one school. Residential customers are billed $33.00 per month for the first 1,000 cubic feet of water use, and commercial customers are billed $49.00 per month for the first 1,000 cubic feet of water use.

2.4.2 Equivalent Dwelling Unit Calculations

Equivalent Dwelling Unit (EDU) calculations are used by USDA to determine the income for the system. The average monthly single-family residential water use (based on the last 12 months) divided by the current number of single-family residential users (connections) equals the average single-family residential usage, which is the EDU Factor. The EDU Factor is then used to

determine the equivalent residential (dwelling) unit water usage for other types of users as listed in Table 8.

Table 8
Equivalent Dwelling Unit (EDU) Information

User Type	Average Monthly Water Usage (gallons)	Number of Users (connections)	Average Monthly Usage per Connection (gallons)	Number of EDUs
Residential (Single-Family)	1,801,780	229	7,868	229
Commercial	164,373	4		21
Industrial	___	0		___
School	33,847	1		4
			TOTAL EDUs:	**254**

Notes:
[a] Based on 2015 water system water use of 24 million gallons as measured by well production.

2.4.3 Current O&M Expenses

Table 9 provides the 2015/2016 fiscal year actual operations and maintenance expenses for JCSD and the typical annual budget. Additional expenses were incurred in the 2015/2016 fiscal year to address the Water Supply Agreement with Jacumba Solar LLC to supply non-potable water. Jacumba Solar LLC reimbursed the JCSD for a majority of these additional expenses.

Table 9
2015/2016 O&M Expenses and Typical Annual Budget

Expense Item	Actual 2015/2106 Fiscal Year	Budgeted
Accountant Services	$5,050.00	$5,300.00
Vehicle:		
Fuel	$1,288.04	$2,100.00
Maintenance	$757.61	$700.00
Building Maintenance	$315.01	$500.00
Chlorine	$1,084.87	$1,400.00
Dues/Subscription/Fees	$41,219.16	$3,500.00
EDD	$1,190.00	$1,500.00
Engineer	$1,000.00	
GL Insurance	$4,434.69	$4,500.00
Legal	$13,491.00	$500.00
Line Maintenance/Operation	$12,391.31	$8,000.00
Medical	$2,054.62	$-
Mileage	$979.77	$1,500.00
Office	$2,955.43	$3,000.00
Payroll	$54,516.73	$67,300.00
Help	$323.93	$-
Payroll Tax	$5,981.00	$6,000.00
Postage	$1,567.10	$1,600.00
Testing	$4,120.00	$2,300.00
Training	$30.00	$500.00
Utilities:		
Electric	$7,070.16	$8,700.00
Phone	$4,360.39	$4,200.00
Workers Compensation	$2,162.52	$2,000.00
TOTALS	**$168,343.34**	**$125,100.00**

Source: JCSD 2016.

The submersible motor in Well No. 4 was replaced in November 2105 and the water meter for Well No. 4 was rebuilt in March 2016. In June 2016, Well No. 4 will be lined with a PVC casing due to severe corrosion (i.e., interior flaking) of the mild steel well casing.

2.4.4 Capital Improvement Program

There currently is not a formal capital improvement program for the water system. Capital expenditures and O&M are currently funded by reserves.

2.4.5 Existing Debts and Required Reserve Accounts

There are no existing debts. There is currently a $177,651.85 cash balance in the JCSD bank account. The JCSD funds O&M and capital improvements from this account.

2.5 Audits – Water/Energy/Waste

A Water Audit has not been completed for the system. The system does not have a water pressure issue. A copy of the 2016 Sanitary Survey for the water system prepared by the lead regulatory agency (SWRCB DDW) is attached (Appendix A).

The 2015 JCSD annual electrical usage is 37,755 kWh. The existing annual consumption of electrical power for domestic water supply from Well No. 4 is approximately 30,000 kWh. This consumption level is expected to increase by approximately 233% with Well No. 8 as the primary supply well as the result of the increase in pump motor horsepower from 10 HP to 40 HP. Additionally, a 4 HP backwash reclaim pump, 2 HP air compressor, 0.25 HP chemical mixer and various chemical dosing pumps will consume electricity to operate the proposed treatment system. As the projected incurs increase in O&M costs for the Well No. 8 treatment system in addition to the increased costs for the electrical power to operate Well No. 8, the JCSD has a need to lower the annual operating costs for its water supply system.

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3 NEED FOR A PROJECT

3.1 Health, Sanitation and Security

As described in the 2016 Sanitary Survey (Appendix A) and previous correspondence from CDPH, Well No. 4 lacks the required sanitary seal to a minimum depth of 50 feet as required by Department of Water Resources (DWR) Bulletins 74-81 and 74-91. In the past decade, Well No. 4 has had a dozen positive total coliform events: one in 2001, three in 2002, two in 2004, four in 2005, one in 2009, and one in 2010. The 2009 and 2010 events are believed to be related to recharge events in the "gully" area immediately adjacent to the well. The 2009 event may be related to heavy recharge associated with a wet winter. The 2010 event occurred after the April 4, 2010 earthquake when neighboring Well 6 became artesian and began spilling into the “gully” area next to Well No. 4 (SWRCB 2016). SRWCB has determined that the shallow alluvium that Well No. 4 draws groundwater from is most likely GWUDI and must meet requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which includes treatment, monitoring and reporting.

The proposed domestic water supply system primary well (Well No. 8) has a high level of manganese (196 µg/l) as determined by well water sample test results. Manganese is a regulated contaminant with a secondary California MCL of 50 µg/l. Secondary standards are based on taste, odor, color, corrosiveness, foaming, and staining properties of water. Although manganese is not considered to be a health hazard, based on a November 16, 2009 letter to JCSD from the California Department of Public Health (Appendix B) Well No. 8 cannot be placed into operation until the manganese treatment facility is completed and in service.

The typical source of manganese contamination is leaching from natural deposits. In deep wells, where the oxygen content is low, the manganese-bearing water is clear and colorless (the manganese is dissolved). Water from the tap may be clear, but when exposed to air, manganese is oxidized and changes from colorless, dissolved forms to colored, solid forms. Colloidal manganese (blank tint) is responsible for the staining properties of water containing high concentrations of manganese. These precipitates or sediments may be severe enough to plug water pipes.

Manganese can affect the flavor and color of food and water. Manganese may react with tannins in coffee, tea, and some alcoholic beverages to produce a black sludge, which affects both taste and appearance. Manganese will cause brownish-black staining of laundry, porcelain, dishes, utensils, and even glassware. Manganese deposits can build up in pipelines, pressure tanks, water heaters, and water softeners. Manganese accumulations become an economic problem when water supply or water softening equipment must be replaced. There are also associated increases in energy costs from pumping water through constricted pipes, or heating water with heating

rods coated with manganese mineral deposits. Manganese is objectionable in water even when present in small concentrations.

A problem that frequently results from manganese in water is manganese bacteria. These nonpathogenic (not health-threatening) bacteria occur in soil, shallow aquifers, and some surface waters. The bacteria feed on manganese in water.

Additionally, frequent repairs required to fix the 4-inch concrete/transite pipeline located in alleyways between Heber and Campo Streets and alone Seeley Avenue has potential to introduce bacterial contamination into the water distribution system and presents a health and sanitary issue.

3.2 Infrastructure and O&M

In the 2015/2016 fiscal year, significant repair and maintenance expenses included replacement of the Well No. 4 pump and motor, rebuilding of the well flow meter and lining of the well. As described in Section 2.3, all alley ways need concrete/transite water mains replaced from Heber Street east to Campo Street. The valves along Campo Street need to be replaced, 6 valves total. Wells No. 4 and No. 6 need a perimeter fence for security purposes. Well No. 6 (non-potable well) needs controls. Decommission Wells 1, 2, 3 and 5 as per DDW requirement.

The approximate per year consumption of electrical power for Well No. 4 when operated by the JCSD as its primary water supply was 30,000 kWh. The submersible pump for Well No. 4 has a 10 HP motor. The JCSD proposed primary water supply, Well No. 8, has a submersible pump with a 40 HP motor. As a result of the increase in consumption of electrical power by Well No. 8, the JCSD's annual operating costs will increase substantially. The JCSD desires to lower the yearly operating costs for its domestic water system, thereby delaying the need for an increase in water rates for its customers.

The existing annual consumption of electrical power for domestic water supply from Well No. 4 is approximately 30,000 kWh. The annual consumption of electrical power is expected to increase by approximately 233% with Well No. 8 as the primary supply well as the result of the increase in pump motor horsepower from 10 HP to 40 HP. With the projected increase in operation and maintenance costs for the manganese treatment system for Well No. 8 in addition to the increased costs for the electrical power to operate Well No. 8, the JCSD has a need to lower the annual operating costs for its water supply system.

Based on this need, it is recommended that a 60 kW direct current (DC) PV ground mounted solar array grid-tie with 280 volt, 3 Phase output be installed in the vicinity of the pump-house for primary water supply Well No. 8 (Figure 4). The 300 watt PV solar panels measure 77-inches by 39.1-inches. About 200 PV solar panels would be required for a 60 kW array. The

approximate size of the array would consist of 6 rows of ground mounted solar racks measuring 109 feet x 7 feet. The approximate annual production from the solar array would be 105,000 kWh and meet practically all of the electrical power consumption requirements for the well motor and treatment system.

3.3 Reasonable Growth

As estimated in Section 1, the historical annual 20 year growth rate in Jacumba Hot Springs is 0.61%. As the County of San Diego General Plan, emphasizes growth in the western portions of the unincorporated County rather than the eastern backcountry areas, the projected 20 year annual growth rate for Jacumba Hot Springs is less than 1%. Assuming a future annual population growth of 0.61%, the current population of 561 persons would expand to 634 persons in 20 years or 73 additional persons. Assuming 2.5 persons per EDU, these result in an additional 29.2 EDUs. At the current EDU demand of 8,734 per month, this results in an additional monthly water demand of 255,033 gallons. The MDD would increase by an estimated 8,501 gallons. The current MDD estimated for this system: is 210,000 gallons. The estimated MDD in 20 years is 218,501 gallons. The current system capacity will have storage capacity equal to or greater than MDD in 20 years based on the projected estimates of population. No new storage capacity is projected to be required.

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4 ALTERNATIVES CONSIDERED

4.1 Description

The DDW is requiring the District to install a treatment system as a condition of the permit for transitioning Well No. 8 to become the main drinking water source. Per the District's 2013 Sanitary Survey permit amendment, DDW has stated that "Jacumba shall submit a permit amendment application including plans and specifications for the addition of iron and manganese removal treatment to CDPH within twelve (12) months of issuance of this permit." The need for iron and manganese removal treatment for Well No. 8 is again stated in the District's 2016 Sanitary Survey. The District has no other alternative than to install a manganese treatment system.

The most common technologies for removal of iron and manganese are oxidation-filtration and oxidizing filters. Another approach is ion exchange. While ion exchange can effectively remove dissolved iron and manganese, it exhibits several operational challenges. Ion exchange (e.g., salt-based resin water softeners) are susceptible to fouling by iron oxides, iron oxidizing bacteria, and are ineffective at removing hydrogen sulfide making this treatment technology unsuitable for this application. The two prominent treatment technologies suitable for the untreated water produced by Well No. 8 are oxidation/filtration or oxidizing filters which subsequently are described.

Oxidation-Filtration: Removal of soluble iron and manganese is readily achieved through an oxidation-filtration process. Oxidation is required to precipitate the soluble metals prior to filtration. Soluble ferrous iron (Fe^{2+}) is oxidized to ferric iron (Fe^{3+}), which readily forms the insoluble iron hydroxide complex $Fe(OH)_3$. Soluble manganous manganese (Mn^{2+}) is oxidized to the manganic species (Mn^{4+}), which forms insoluble manganese dioxide (MnO_2). Filtration media in conventional gravity filters or pressure filters are commonly used to remove the particulate metal oxides. The filter media is then backwashed on a regular basis to restore the filter capacity. Several manufacturers offer competing oxidation-filtration systems: Filtronics, Pureflow, and Loprest among others.

Oxidizing Filter: Removal of soluble iron and manganese is readily achieved by oxidizing filters that utilize an impregnated media to absorb and oxidize the soluble metals so that they can be retained in the granular media. Greensand (glauconite), anthracite sand, and natural or synthetic zeolites are used in a conventional gravity filter or a pressure filter. Potassium permanganate ($KMnO_4$) is used to coat greensand and anthracite with manganese oxide, giving it a catalytic effect. The coated media oxidizes and removes iron and manganese, usually without requiring an additional oxidation-precipitation step. The coating can be maintained either by a continuous potassium permanganate feed or by backwashing at set intervals with a potassium permanganate solution. The latter is preferred as it alleviates the risk of $KMnO_4$ bleed-through which can cause

pink discoloration of the treated water. Hydrogen sulfide and other similar substances have a strong potential to cause fouling of the filter media, reducing filter efficacy. Oxidizing filters perform best with water low in phosphate and organic material. In addition, chlorine will adversely affect the catalytic property of the filter media and should be added after filtration (USDA 1999).

The following chemical reactions describe the oxidation of Fe^{2+} by chlorine and permanganate, respectively (MWH 2012).

$$2Fe(HCO_3)_2 + Ca(HCO_3)_2 + Cl_2 \rightarrow 2Fe(OH)_3 + CaCl_2 + 6CO_2$$

$$3Fe(HCO_3)_2 + KMnO_4 + 2H_2O \rightarrow 3Fe(OH)_3 + MnO_2 + KHCO_3 + 5CO_2$$

From the above equations, it is found that 0.64 lbs of Cl_2 are required to oxidize 1 lb of Fe^{2+}, and 0.94 lbs of $KMnO_4$ are required to oxidize 1 lb of Fe^{2+}.

The following chemical reactions describe the oxidation of Mn^{2+} by chlorine and permanganate, respectively (MWH 2012).

$$Mn(HCO_3)_2 + Ca(HCO_3)_2 + Cl_2 \rightarrow MnO_2 + CaCl_2 + 2H_2O + 4CO_2$$

$$3Mn(HCO_3)_2 + 2KMnO_4 \rightarrow 5MnO_2 + 2KHCO_3 + 2H_2O + 4CO_2$$

From the above equations, it is found that 1.29 lbs of Cl_2 are required to oxidize 1 lb of Mn^{2+}, and 1.92 lbs of $KMnO_4$ are required to oxidize 1 lb of Mn^{2+}.

The following chemical reactions describe the oxidation of H_2S by chlorine and permanganate, respectively (MWH 2012; Cadena and Peters 1988; White 1999).

$$H_2S + 4Cl_2 + 4H_2O \rightarrow 8HCl + H_2SO_4, \ pH < 7.5$$

$$H_2S + Cl_2 \rightarrow 2HCl + S_0, \ pH > 7.5$$

$$3H_2S + 2KMnO_4 \rightarrow 3S_0 + 2H_2O + 2MnO_2 + 2KOH, \ pH < 7.5$$

$$3H_2S + 8KMnO_4 \rightarrow 8MnO_2 + 3K_2SO_4 + 2H_2O + 2KOH, \ pH > 7.5$$

The oxidation of sulfide by both chlorine and permanganate is dependent on pH. From the above equations, it is found that 2.1-8.3 lbs of Cl_2 are required to oxidize 1 lb of H_2S, and 3.3-13.2 lbs of $KMnO_4$ are required to oxidize 1 lb of H_2S.

More potassium permanganate is required than chlorine to oxidize iron, manganese, and hydrogen sulfide. The greater chemical demand, greater chemical cost of potassium permanganate compared to chlorine, and the potential presence of H_2S make an oxidation-filtration system at Well No. 8 the best-fit treatment system alternative. Competitive proposals will be solicited from oxidation-filtration system manufacturers in accordance with USDA requirements for maximum open and free competition. Pilot testing is not expected to be required.

Alternatives considered for evaluation of technical feasibility for each system component that needs to be included in the proposed project is provided in Table 10.

Table 10
Alternatives Considered

Proposed Project Component	**Alterative 1** – No Action	**Alternative 2** - Provide Manganese Filtration for Well No. 8	**Alternative 3** – Provide Manganese Treatment for Well No. 8, Install a Ground Mounted PV Solar Array, Develop Well No. 7 as a Back-up Source and Replacement for Well No. 4, Replace 6,038 feet of 4-inch Transite/Cement Pipeline, Replace 6 Valves on Campo Street and Destroy Existing Inactive and Abandoned Wells No.'s 1, 2, 3, and 5.
Water Supply and Treatment	Unacceptable due to the current state of the domestic water supply systems primary Well No. 4 and emergency back-up Well No. 8.	Installation of manganese filters, Installation of automatic filter backwash, Installation of air compressor, Construction of impermeable filter backwash evaporation pond. Emergency backup generator. This alternative is not acceptable because the increased operation and maintenance costs for the domestic water supply system would still exist and there would be no back-up replacement well for Well No. 4.	This alternative includes all improvements outlined in Alternative No. 2 in addition to the installation of a 60 kW ground mounted PV solar array grid-tie system, the development of Well No. 7 as a back-up source for primary Well No. 8, replacement of 6,038 feet of failing 4-inch transite/cement pipeline, replacement of 6 butterfly valves on Campo Street and the destruction of Well No's 1, 2, 3, and 5.
Water Meters			Install a dedicated well water meter for Well No. 7
SCADA		Replace outdated SCADA System on Well No.8	Replace outdated SCADA System on Well No.8 and Install SCADA System for Well No. 7.

4.2 Technical Feasibility Evaluation of Alternatives

4.2.1 Agreements

Alternatives 2 and 3 are technically feasible and do not require any agreements for operation and/or connection provided that JCSD staffs the required treatment operator position. If JCSD elects to use a contract treatment operator, than a contract would be required for this position. There are several local companies/contractors that provide licensed treatment operators.

4.2.2 Compliance Issues/Design Criteria

The design criteria for the proposed water treatment system are based on the elevated concentration of manganese at Well No. 8. Well No. 8 has a raw water manganese concentration of 196 µg/l. This exceeds the secondary MCL of 50 µg/l. Treatment of water pumped from Well No. 8 will address the manganese compliance issue, bringing it below the secondary California MCL. Although temperature it is not a regulated parameter, Well No. 7 and No. 8 have elevated temperature at 86 °F and 78 °F, respectively. Initially, Well No. 7 was not included in the domestic water supply system due to the elevated temperature. Blending of water from Well No. 7 with Well No. 8 will address the elevated temperature issue.

Figure 4 shows the location of the alternative components. Figure 5 provides a process diagram for the proposed treatment system.

4.2.3 Environmental Impacts

Alternative 1 – No Action; will have no impact to the environment as no additional project facilities will be constructed. Alternative 2 - Provide Manganese Filtration for Well No. 8; will require additional land disturbance to construct the treatment system and evaporation pond. Alternative 3 – Provide Manganese Treatment for Well No. 8, Install a Ground Mounted PV Solar Array, Develop Well No. 7 as a Back-up Source and Replacement for Well No. 4, and Destroy Existing Inactive and Abandoned Wells No.'s 1, 2, 3, and 5 or the preferred alternative; will require additional land disturbance to construct the treatment system, evaporation pond and PV solar array.

Existing conditions observed in the Project study area suggest that a majority of the study area has been previously graded and is substantially disturbed. The Project study area is relatively flat and uniform in topography and includes an existing chain-link fence, water pump facility structure, electric generator, and historic road. The majority of the Project study area supports a limited amount of native vegetation, almost all of which is highly disturbed. The site does not provide good quality habitat for native plant species, and is dominated by bare ground and non-native perennial and weedy annual species. A total of seventeen plant species were identified within the study area, including seven non-native species and ten native species (Dudek 2016a). Due to the predominance of non-native vegetation and site disturbance characteristics, the Project study area has limited potential to provide habitat that supports sensitive wildlife species. The Project is not likely to impede wildlife movement in the area due to the limited size and vast open space surrounding the site. (Dudek 2016). Potential biological impacts as a result of Alternatives 2 and 3 are less than significant.

Dudek's Phase I cultural resources inventory of the project area suggests that there is a moderate to high potential for the inadvertent discovery of intact cultural deposits during earth moving activities. In consideration of the topography and the high density of known archaeological resources in the surrounding area, it is recommended that a cultural resources mitigation program be implemented. Mitigation should include archaeological and Native American monitoring during initial disturbance of subsurface soils within the Project APE. Following initial ground-disturbing work, cultural monitoring may be adjusted or discontinued at the recommendation of archaeological principal investigator (Dudek 2016b).

The improvements to the domestic water supply from the JCSD primary Well No. 8 would constitute a minor alteration of an existing public facility and the addition of a health or safety protection device to an existing facility to make its water clean for domestic water supply use. The Well improvements would not increase JCSD's water production capacity. As such the improvements fit within Class 1, Existing Facilities, Categorical Exemption from the California Environmental Quality Act (CEQA) per CEQA Guidelines section 15301(d).

Residuals generated form the treatment process includes backwash of the filter every 8 to 12 hours of treatment operation. Water required for the backwash will be captured in the evaporation pond. The dried residuals will periodically require hauling off site to an appropriate facility for disposal.

4.2.4 Land Requirements

The JCSD has acquired the parcel of land (APN 660-040-26) on which Wells No. 7 and 8 are located. The approximate 1.54 acre parcel was purchased with a grant received from the USDA. JCSD has immediate access to the land from Old Highway 80. There is sufficient space to construct the proposed facility including the proposed PV solar array (Figure 4).

4.2.5 Potential Construction Problems

No construction problems have been identified that may affect the cost or feasibility of the alternative.

4.2.6 Sustainability Considerations

Water Efficiency: Water efficiency in the desert community is encouraged by limiting overall outdoor water use and by using drought tolerant plantings. Water waste/loss management consists of proactively replacing aging infrastructure and immediately responding to leaks.

Energy Efficiency: The 2015 JCSD annual electrical usage is 37,755 kWh. The existing annual consumption of electrical power for domestic water supply from Well No. 4 is approximately 30,000 kWh. This consumption level is expected to increase by approximately 233% with Well No. 8 as the

primary supply well as the result of the increase in pump motor horsepower from 10 HP to 40 HP.[7] Additionally, 4 HP backwash reclaim pump, 2 HP air compressor, 0.25 HP chemical mixer and various chemical dosing pumps will consume electricity to operate the proposed treatment system. The added backwash reclaim pump and air compressor requires 4,000 kWh/yearr for a total power demand of 104,000 kWh/year (246% increase relative to 30,000 kWh/yr).[8] As the projected incurs increase in operation and maintenance costs for the Well No. 8 treatment system in addition to the increased costs for the electrical power to operate Well No. 8, the JCSD has a need to lower the annual operating costs for its water supply system.

Based on this need, it is recommended that a 40 kW_{DC} PV ground mounted solar array with 280 volt, 3 Phase output be installed in the vicinity of the pump-house for primary water supply Well No. 8 (Figure 4). The 300 watt PV solar panels measure 77-inches by 39.1-inches. About 134 PV solar panels would be required for a 40 kW array. The approximate size of the array would consist of four (4) rows of ground mounted solar racks measuring 111 feet x 7 feet. The approximate annual production from the solar array would be 70,000 kWh, and meet the majority of the electrical power consumption for the JCSD water supply system.

Other: As JCSD currently only chlorinates its water and no other treatment is required, a treatment system that is simple to operate and maintain is critical. Additionally JCSD would like to minimize waste byproducts as there is no local facility to process wastewater.

4.3 Alternative Cost Estimates

Alternative 3 is the only alternative determined to be technically feasible. Construction cost estimates for Alternative 3 are provided in Table 11.

7 Energy Requirement (kW/h/year) = Horsepower x 0.746 = Power (kW) x Run Time (hours/day) x Year (365 days). Well Pump = 40 x 0.746 = 29.8 kW x 9.2 hours per day = 274 kWh/day x 365 days = 99,840 kW/h/year

8 Reclaim Pump = 4 x 0.746 = 3.0 kW x 3.0 hours per day = 9 kWh/day x 365 days = 3,267 kW/h/year
Air Compressor = 2 x 0.746 = 1.5 kW x 2.0 hours per day =3 kWh/day x 365 days = 1,089 kW/h/year
Chemical Mixer = 0.25 x 0.746 = 0.2 kW x 4.0 hours per day = 0.7 kWh/day x 365 days = 272 kW/h/year
Total = 104,469 kW/h/year

Table 11
Construction Cost Estimates – Alternative 3

No.	Item	Qty	Unit	Unit Price	Total Price
1	Mobilization/Demobilization	1	LS	$12,000	$12,000
2	Clearing and Grubbing	1	LS	$2,000	$2,000
3	Earthwork/Grading	80	CY	$50	$4,000
4	Construction Survey & Staking	1	LS	$5,000	$5,000
5	Concrete	30	CY	$800	$24,000
6	Furnish and Install Manganese Filtration System including Chemical Feed System, Air Compressor, Backwash Tank with Accessories	1	LS	$330,000	$330,000
7	Contractor Sampling & Testing	1	LS	$5,000	$5,000
8	Furnish and Install Ground Mount Solar Panel Grid-Tie System with Accessories	1	LS	$208,000	$208,000
9	Furnish and Install Solar Panel Array & Backwash Pond Site Fencing	700	LF	$60	$42,000
10	Furnish, Install, and Test Mechanical, Electrical, Telemetry and Piping Improvements For Well No. 7 including 40 HP Submersible Pump and Motor, Depth Monitor System & Pump Control, Well Head Improvements, and 4" DIP and Accessories	1	LS	$100,000	$100,000
11	Furnish, Install, Test and Commission Elect. Improvements for Manganese Filtration System and Ground Mount Solar Panel Grid-Tie System with Accessories	1	LS	$15,000	$15,000
12	Furnish, Install, Test, and Commission Emergency Back-up Diesel or Propane Generator – 242 kVA, 194 kW, 1 & 3-Phase Generator	1	LS	$125,000	$125,000
13	Destroy Wells 1, 2, 3, and 5	1	LS	$25,000	$25,000
14	Replace 6,038 Feet of 4-inch Pipeline	6,038	FT	$42	$254,000
15	Replace 6 Butterfly Valves on Campo Street	1	LS	$9,000	$9,000
				Subtotal Construction Cost:	**$1,160,000**

An O&M cost breakdown for Alternative 3 is provided in Table 12.

Table 12
O&M Breakdown – Alternative 3

O&M Expense Item	Projected	Notes
Personnel (salary, benefits, payroll tax, insurance, training)	$80,950	A certified treatment operator will be required for the treatment system (assumes 30% increase in personnel costs)
Treatment Operations Support Contract for a certified treatment operator	$40,000	As the District currently does not have an in-house certified treatment operator. These services will need to be initially contracted. A planning level estimate is $35,000 to $40,000.
Administrative Costs (office supplies, printing, etc.)	$7,100	
Insurance	$6,200	
Energy Cost (fuel and electrical)	$1,200	Assumes projected $100 per month for electricity due to offset by proposed solar system
Process Chemical	$3,400	Assumes existing chlorine demand plus costs for chemical feed
Monitoring and Testing	$5,768	Assumes 40% increase for monitoring treatment system
Professional Services	$19,300	
Residuals/Waste Disposal	$500	Filter backwash residual (dried)
Other (describe)	$0	
Repairs and Maintenance	$8,000	
Payroll Taxes	$10,700	
Total:	**$183,118**	

4.4 Alternatives Determined to be Technically Unfeasible

Alternative 1 is unacceptable due to the current state of the domestic water supply systems primary Well No. 4 and emergency back-up Well No. 6.

5 SELECTION OF ALTERNATIVE

5.1 Cost Evaluation of Alternatives

A Present Worth Cost Analysis is not applicable due to the fact that there is only one feasible alternative.

5.2 Non-Monetary Factors Analysis

Non-monetary factors have not been considered in this evaluation as there is only a single technically feasible alternative. Alternative 2 is discarded as an unfeasible option because the increased operation and maintenance costs for the domestic water supply system would still exist and there would be no back-up replacement well for Well No. 4.

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6 PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

6.1 Description

A proposed project description for Alternative 3 is provided in Table 13.

Table 13
Proposed Project Description – Alternative 3

Proposed Project Component	Proposed Alternative Description
Water Supply and Treatment	The improvements to the domestic water supply from the JCSD primary Well No. 8, would include the installation of a single manganese filter, air compressor, filter backwash tank, and a backwash evaporation pond. The manganese filter and air compressor would be located to the north of the existing masonry block pump-house on a reinforced concrete slab. The backwash evaporation pond would be located approximately 50 feet north of the manganese filter. The improvements to the back-up domestic water supply source Well No. 7 would include the installation of a 40 HP submersible well pump and motor, well depth transducer, well head facilities, telemetry system, and approximately 55 feet of 4-inch DIP. The 4-inch DIP would be located from the well head of Well No. 7 to an existing 4-inch tee located on the discharge pipe from Well No. 8. The current water temperature and level of iron in the water supply from Well No. 7 would be reduced by blending with water from Well No. 8 in the water storage tanks. The 60 kW ground-mounted solar array grid-tie system would be installed to the northeast of the existing masonry block pump-house, and would include 200, 300 Watt solar modules and 6 rows of panels measuring about 109 feet x 7 feet. All of the improvements would be located on a site owned by the JCSD, and would be beyond the 100-yr floodplain for Boundary Creek. Destruction of Well No's 1, 2, 3, and 5 in accordance with DWR regulations would ensure protection of groundwater resources from potential surface contamination. Approximately 6,038 linear feet of 4-inch concrete/transite pipeline would be replaced in the alley ways between Heber and Campo Streets and along Seeley Avenue. Replacement of 6 Butterfly Valves on Campo Street.

A layout map of the proposed project showing the location of the planned system components is presented in in Figure 4. A schematic diagram for the treatment process is located in Figure 5. A layout map depicting the segments of the proposed pipeline replacement is provided in Figure 6.

6.2 Project Schedule

A schedule identifying proposed dates for submittal and anticipated approval of all required documents permit applications, advertisement for bids, loan closing, contract award, initiation of

construction, substantial completion, final completion, and operation startup in the form of Gantt chart is provided as Figure 6.

6.3 Permit Requirements

Well No. 8 is an emergency use only back-up well for the JCSD that is currently the only permitted back-up well with SWRCB's DDW. Well No. 7 and Well No. 4, as described above, will be used only as secondary back-up wells in the future once the Well No. 8 treatment system comes online. JCSD is solely reliant on groundwater for supply and besides the groundwater wells there is no other connection sources. JCSD will need to amend its DDW permit to account for the proposed changes in well supply structure and pipeline replacement. Building, solar system and electrical permits will also be required to be obtained by the selected contractor from the County of San Diego. A permit for the emergency backup generator will need to be obtained from the San Diego County Air Pollution Control District. The Colorado Regional Water Quality Control Board (RWQCB) will need to be involved during the final design phase to determine whether a Waste Discharge Requirements (WDRs) permit will be required or if a waiver is available. If a WDRs permit is required, it will need to be filled 120 days prior to beginning to discharge waste (Colorado RWQCB 2016).

6.4 Sustainability Considerations

See Section 4.2.7 for water efficiency, energy efficiency, and other sustainability considerations.

6.5 Total Project Estimate

A Total Project Cost Estimate is provided in Table 14. A separate project Construction Cost Estimate breakdown is provided in Appendix D.

Table 14
Total Project Cost Estimate – Alternative 3

ITEM		Total
Property Purchase/Lease Agreements		
Easement Acquisition/Right of Way/Water Rights		
Bond Counsel		
Legal Counsel		$11,000
Interest/Refinancing Expense		
Other (identify)		
Environmental Services	*Subtotal*	$12,000
- CEQA Environmental Report	$6,000	
- NEPA Environmental Report	$6,000	
- Environmental Mitigation Contract Services		
Total Environmental Services:		
Engineering Services		$314,000
Basic Services:	Subtotal	
- Preliminary Engineering Report (PER)	$20,000	
- Preliminary and Final Design Phase Services	$95,000	
- Bidding/Contract Award Phase Services	$40,000	
- Construction and Post-Construction Phase Services (w/o inspection)	$20,000	
- Resident Project Representative Services (resident inspector)	$60,000	
Additional Services:		
- Permitting	$20,000	
- Regulatory Compliance Reports	$10,000	
- Environmental Mitigation Services (Construction Phase)	$15,000	
- Easement Acquisition/ROW's Services (Construction Phase)		
- Surveying Services (Construction Phase)	$10,000	
- Operation & Maintenance Manual(s)	$2,000	
- Geotechnical Services		
- Hydrogeologist Services	$15,000	
- Materials Testing Services (Construction Phase)	$7,000	
- Other Services (describe)		
Total - Engineering Services:		
Equipment/Materials (Direct purchase using approved USDA methods, separate from construction bid/cost)		
Construction Cost Estimate (Attach breakdown)		$1,160,000
Contingency		$174,000
TOTAL PROJECT COST ESTIMATE:		**$1,671,000**

6.6 Annual Operating Budget Estimate

Detailed O&M estimated cost information and Short-Lived Asset Reserve information for the proposed project are described below.

6.6.1 Income

Current users include residential, commercial and one school. Residential customers are billed $33.00 per month for the first 1000 cubic feet of water use, and commercial customers are billed $49.00 per month for the first 1000 cubic feet of water use. The JCSD is currently updating fiscal year 2016/2017 rates. It is expected that monthly rates will increase by approximately $10.00 per month for all customer classes served. Based on the 229 residential, 4 commercial and 1 school or 234 connections (254 EDUs), the current annual income is estimated at $105,000 compared to actual recent annual income of $94,000. With the proposed $10.00 per month increase, the estimated annual income is approximately $135,864.[9] In 2018, the District anticipates that it will be necessary to incur an additional rate increase of approximately 24% per month for all accounts. A rate study will be completed to determine how costs are legally allocated to residential and commercial accounts. The approximate 24% rate increase will result in an annual income to the JCSD of about $168,132.[10]

Additional source of income include periodic sales of non-potable water to construction projects in east San Diego County. These projects are typically infrequent and require varying volumes of water supply. Thus, sale of non-potable construction water is not a reliable source of income on a recurring basis. If the District enters into a long-term non-potable water sales agreements, this could potentially offset some of the proposed rate increase but this potential funding source is uncertain.

6.6.2 Annual Operations and Maintenance (O&M) Costs

Detailed projected O&M costs for the system after the proposed improvements have been completed are provided in Table 15.

[9] 229 residential accounts x $43 per month = $9,847 per month. 1 school and 4 commercial accounts at 25 EDUs x $59 per month = $1,475. Total future income per month = $11,322 or $135,864 per year.

[10] $135,864 x 1.2375022 = $168,132

Table 15
Proposed Project O&M Costs

O&M Expense Item	Current	Projected	Change	Notes
Personnel (salary, benefits, payroll tax, insurance, training)	$77,517	$80,950	$ (3,433)	Personnel cost increase due to additional hours required to assist with system operations & maintenance.
Treatment Operations Support Contract for a certified treatment operator		$40,000	$(40,000)	As the District currently does not have an in-house certified treatment operator. These services will need to be initially contracted. A planning level estimate is $35,000 to $40,000.
Administrative Costs (office supplies, printing, etc.)	$7,100	$7,100	$ -	
Insurance	$4,500	$6,200	$ (1,700)	
Energy Cost (fuel and electrical)	$10,800	$1,200	$9,600	Assumes projected $100 per month for electricity connection fees due to offset by proposed solar system
Process Chemical	$1,400	$3,400	$ (2,000)	Assumes existing chlorine demand plus costs for chemical feed
Monitoring and Testing	$4,120	$5,768	$ (1,648)	Assumes 40% increase for monitoring treatment system
Professional Services	$19,300	$19,300	$ -	
Residuals/Waste Disposal		$500	$ (500)	Disposal of dried filter backwash solids
Other (describe)			$ -	
Repairs and Maintenance	$12,516	$8,000	$4,516	
Payroll Taxes	$8,847	$10,700	$(1,853)	
Total:	$146,100	$183,118	$(37,018)	

6.6.3 Debt Repayments

JCSD is submitting USDA form RD-442-7 – Operating Budget to determine if the project is eligible for grant funding. The project likely will not be built absent grant funding.

6.6.4 Reserves

No debt service is currently anticipated or provided for the construction of the proposed project.

Short-Lived Asset Reserve

Examples of typical water system Short-Lived Assets are provided in Table 18.

Table 16
Proposed Project Short-Lived Assets

Equipment	Useful Life Expectancy (Years)
Pumps	10-15
Chlorination Equipment	10-15
Other Treatment Plant Equipment	10-15
Meters	10-15
Electrical Systems	5-10
Solar Power System Inverters	15
Transportation Equipment	5-10
Computers	1-5
Lab/Monitoring Equipment	5-10
Tools and Shop Equipment	10-15
Communications Equipment	5-10

Source: EPA 2003.

A list of Short-Lived Assets for the proposed project is provided in Table 17. Useful Life for Short-Lived Assets are limited to less than 15 years. The Annual Reserve is Replacement Cost divided by the Useful Life. The recommended annual reserve deposit to fund the replacement of short-lived assets is $18,733.

Table 17
Proposed Project Short-Lived Assets

Equipment	Useful Life (years)	Replacement Cost	Annual Reserve
40 HP Well Pump & Motor	10	$25,000	$2,500
40 HP Well Pump & Motor	10	$25,000	$2,500
Chlorination Equipment	10	$5,000	$500
Electrical Equipment	5	$15,000	$3,000
Flow Meters	10	$5,000	$500
Emergency Generator	15	$125,000	$8,333
Solar Power System Inverters	15	$21,000	$1,400
		Total:	**$18,733**

7 CONCLUSIONS AND RECOMENDATIONS

Due to the water quality issues associated with the existing JCSD domestic water supply system, and the current costs associated with the operation of the existing JCSD domestic water supply system, we recommend the proposed improvements, outlined in this report as Alternative 3, be implemented as soon as possible.

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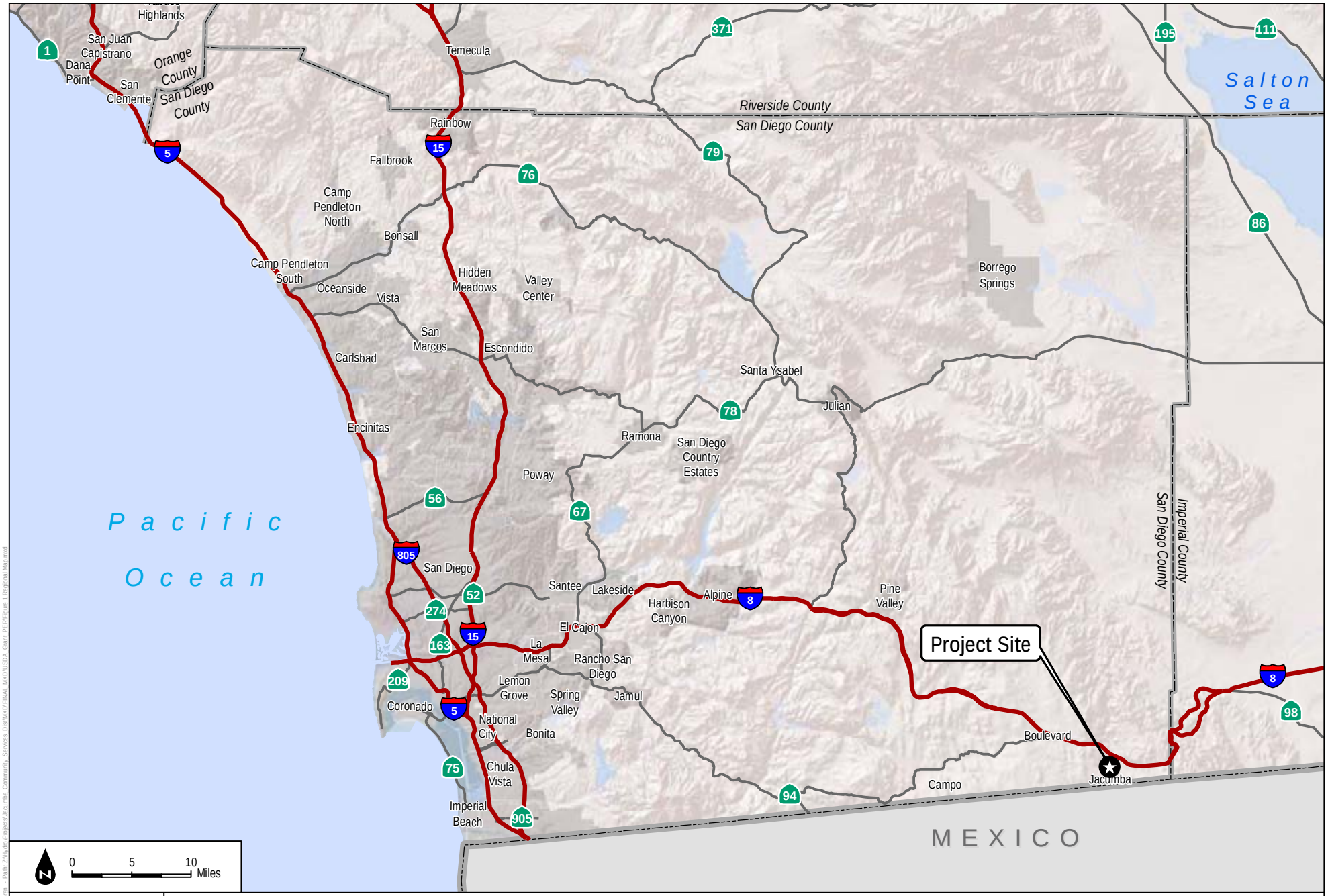

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Figure 1
Regional Map

Proposed Domestic Water Supply Project Manganese Treatment System Water Supply Wells No. 7 and 8

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GENERAL NOTES

① All valves along Campo Street (6 valves total) need to be replaced

② From Heber Street east to Campo Street, all alley-way concrete/transite water mains need to be replaced

③ Well 8 perimeter needs to be fenced (see Figure 4)

④ Wells 4 and 6 need perimeter fence for security

⑤ Well 6 (non-potable well) needs controls

⑥ Need to abandon Wells 1, 2 3 and 5

Jacumba Community Services District (JCSD)

- JCSD Service Area
- Main Water Transmission Line
- Booster Station
- Water Tank
- JCSD Wells
- Fire Hydrant

JCSD 5
JCSD 6
JCSD 3
JCSD 4
JCSD 3a
JCSD 8
JCSD 7
JCSD Park Well
JCSD 2
JCSD 1
Gasoline Creek
Jacumba
BM 2863
Res
MEXICO
2780
280
233°

0 300 600 Feet

SOURCE: USGS; JCSD

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Figure 2
Existing Facilities Topographic Map

Proposed Domestic Water Supply Project Manganese Treatment System Water Supply Wells No. 7 and 8

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GENERAL NOTES

① All valves along Campo Street (6 valves total) need to be replaced

② From Heber Street east to Campo Street, all alley-way concrete/transite water mains need to be replaced

③ Well 8 perimeter needs to be fenced (see Figure 4)

④ Wells 4 and 6 need perimeter fence for security

⑤ Well 6 (non-potable well) needs controls

⑥ Need to abandon Wells 1, 2 3 and 5

Seeley Ave
Brawley Ave
Holtville Ave
Calexico Ave
El Centro Ave
Heber St
Jacumba St
N Railroad St
Old Highway 80
JCSD 5
JCSD 6
JCSD 3
JCSD 4
JCSD 3a
JCSD 8
JCSD 7
Inset Map Extent
JCSD Park Well
JCSD 2
JCSD 1
MEXICO

0 250 500 Feet

0 100 200 Feet

Jacumba Community Services District (JCSD)

- JCSD Service Area
- Parcels in Seperate Pressure Zone with Booster Pump Connection
- JCSD Owned Parcels
- Main Water Transmission Line
- Booster Station
- Water Tank
- JCSD Wells
- Fire Hydrant

SOURCE: Bing Maps; JCSD

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Figure 3
Existing Facilities Aerial Photograph Map

Proposed Domestic Water Supply Project Manganese Treatment System Water Supply Wells No. 7 and 8

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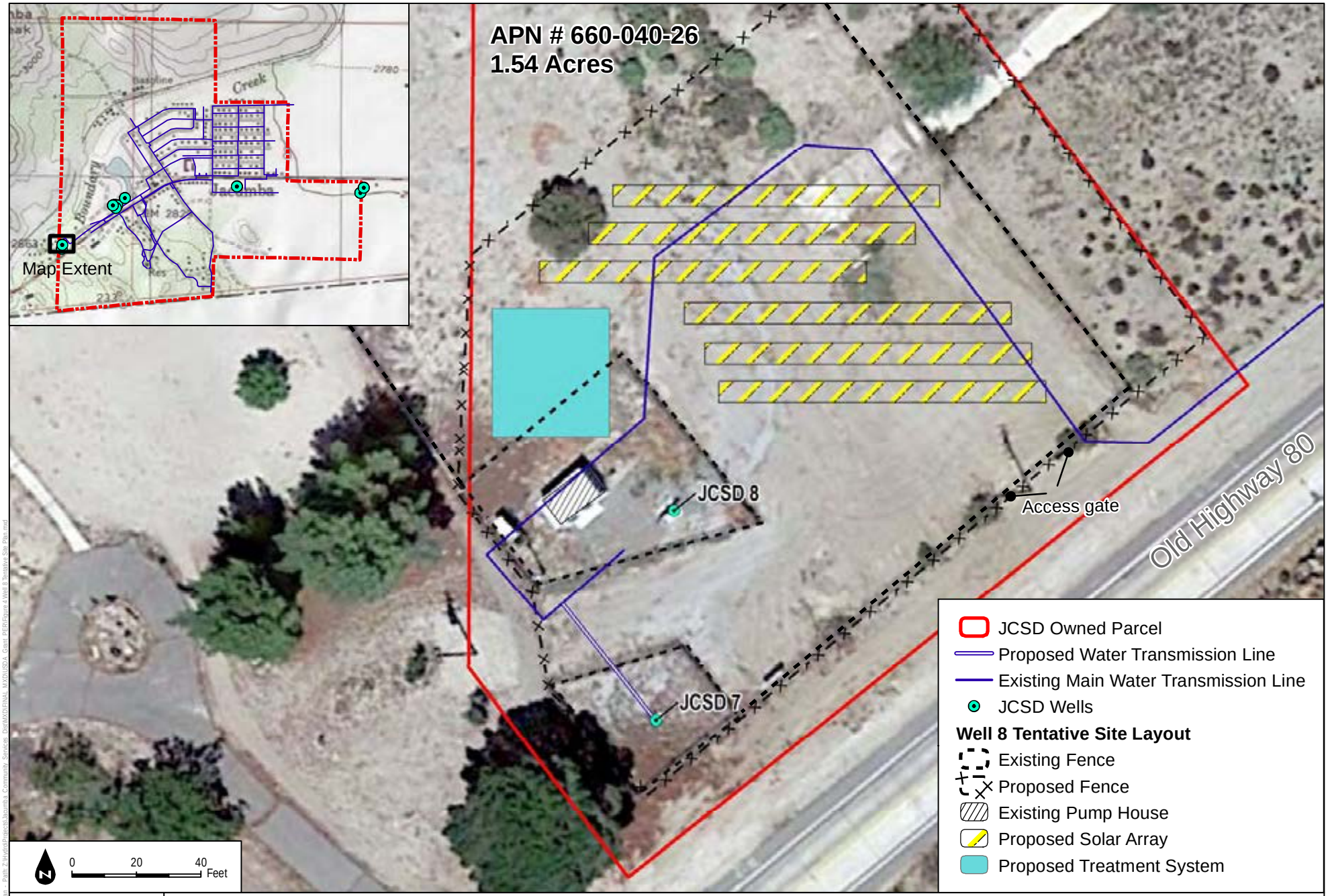

SOURCE: Bing Maps; JCSD

Figure 4
Well 8 Tentative Site Layout

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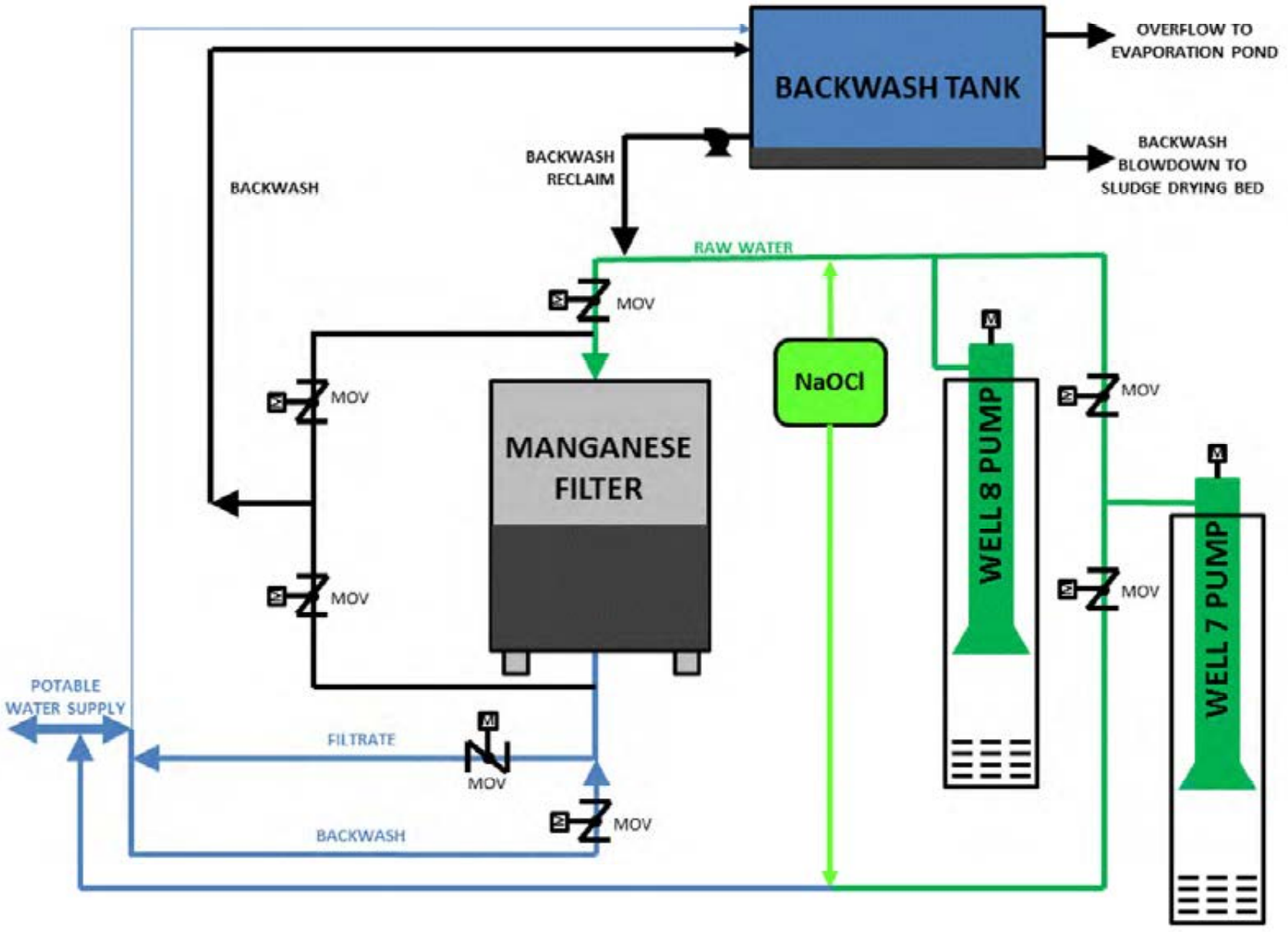

Figure 5
Treatment Process Schematic

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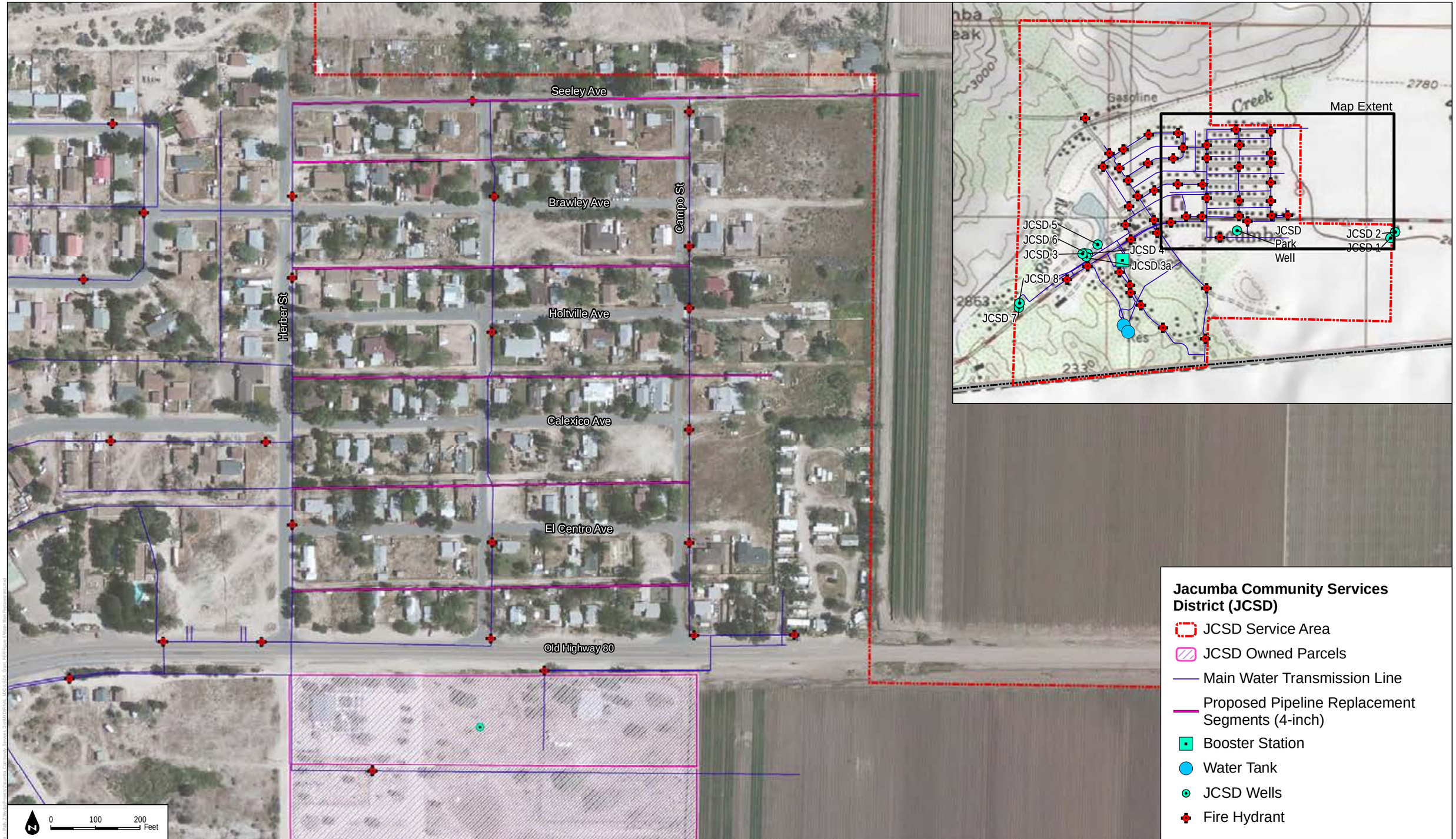

SOURCE: Bing Maps; JCSD

Figure 6
Proposed Pipeline Replacement Segments

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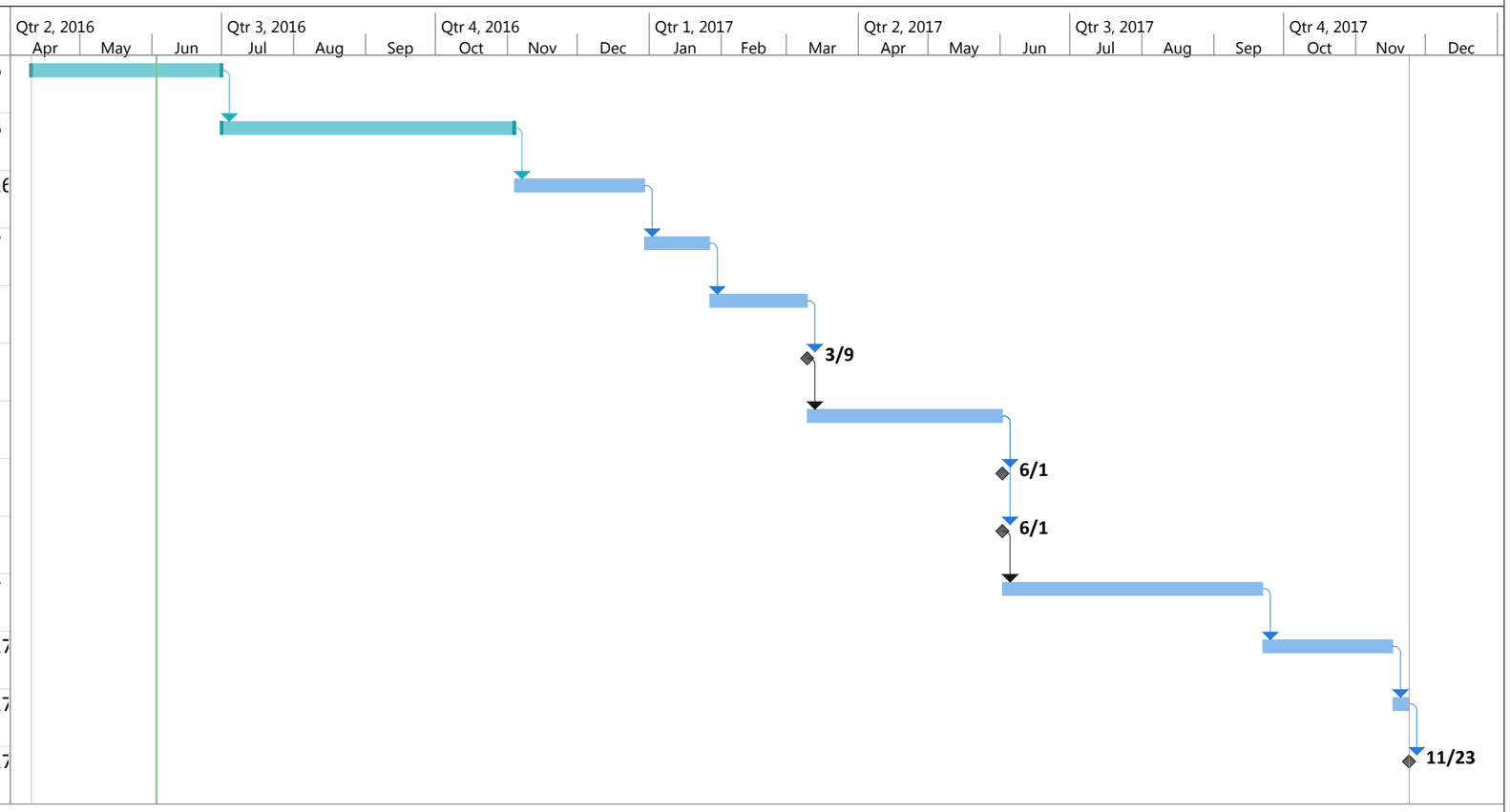
Jacumba Community Services District Well 7 and 8 Treatment System Project Preliminary Schedule

ID	Task Name	Duration	Start	Finish
1	USDA Grant Preparation	60 days	Sun 4/10/16	Thu 6/30/16
2	USDA Review and Grant Approval	90 days	Fri 7/1/16	Thu 11/3/16
3	Preliminary Design	40 days	Fri 11/4/16	Thu 12/29/16
4	Final Design	20 days	Fri 12/30/16	Thu 1/26/17
5	Project Bid Phase	30 days	Fri 1/27/17	Thu 3/9/17
6	Bid Opening	0 days	Thu 3/9/17	Thu 3/9/17
7	Construction Contract and Admin	60 days	Fri 3/10/17	Thu 6/1/17
8	Construction Award	0 days	Thu 6/1/17	Thu 6/1/17
9	Notice to Proceed	0 days	Thu 6/1/17	Thu 6/1/17
10	Procurement of Construction Elements	80 days	Fri 6/2/17	Thu 9/21/17
11	Construction Phase	40 days	Fri 9/22/17	Thu 11/16/17
12	Plant Commission and Startup	5 days	Fri 11/17/17	Thu 11/23/17
13	Notice of Completion	0 days	Thu 11/23/17	Thu 11/23/17



Project: Well 7-8 Treatment Sched
Date: Fri 6/3/16

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

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Figure 7
Schedule for Proposed Domestic Water Supply Manganese Treatment System Water Supply Wells No. 7 and 8

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APPENDIX A

2016 Sanitary Survey

State Water Resources Control Board
Division of Drinking Water

May 18, 2016

Debby Troutt
General Manager
Jacumba Community Sanitation District
1266 Railroad St
Jacumba, Ca 91934

Dear Ms. Troutt:

JACUMBA COMMUNITY SANITATION DISTRICT, SYSTEM NO. 3710011
2016 SANITARY SURVEY

The purpose of this letter is to provide a summary of deficiencies and recommendations for the sanitary survey conducted by Mr. Scott Ketcham on March 29, 2016 for Jacumba Community Sanitation District water system (Water System). For greater detail on each of the elements discussed below, please feel free to contact me or Mr. Ketcham for a conference call or meeting.

Sanitary Survey Deficiencies:

1. **Sources: Well 4**

   Well 4 is sited in a shallow alluvial aquifer that is layered above a granitic batholith aquitard. Well 4 is 60-feet deep and is believed to be perforated starting at 40-feet. The area around the well has historically been described as a swamp, and is in a vernal pool depression that is fed by the thermal spring discharge from the Jacumba Hot Springs Spa and Resort. The spring discharges into the "pond" at a location that is approximately 320 feet to the northeast and upstream of the well. The "gully" area immediately adjacent to the well is currently the receiving basin for stormwater runoff from Old Highway 80. During precipitation events stormwater is discharged approximately 75 feet east and upstream of the well.

   These discharges are of concern due to the combination of a high ground water table surrounding the well (i.e. depth of 10 feet in summer and 8 feet in winter) and the extremely high percolation rate (i.e. less than 1 minute per inch) of the shallow aquifer. Soils with high percolation rates, like the ones

present in Jacumba, do not provide the level of filtration, natural pathogen attenuation, and groundwater table protection that are accorded by unconsolidated soils with lower percolation rates. Therefore, there is the potential for pathogenic organisms to short circuit through the aquifer and enter directly into the well.

Additionally, the Department of Water Resources Water Well Standards (Bulletins 74-81 & 74-91) require a sanitary seal to a minimum depth of 50-feet. Based on historic documentation, the sanitary seal of Well 4 may not exist or may only extend to a depth of 20-feet.

These factors of the well's physical location, soil type, and lack of adequate sanitary seal elevate the potential of the well to be Groundwater Under the Direct Influence of Surface Water (GWUDI).

In the case of Well 4, the GWUDI concern is further elevated due to a historic trend of pre-chlorination total coliform positive events. In the past decade, Well 4 has had a dozen positive total coliform events: one in 2001, three in 2002, two in 2004, four in 2005, one in 2009, and one in 2010. The 2009 and 2010 events are believed to be related to recharge events in the "gully". The 2009 event may be related to heavy recharge associated with a wet winter. The 2010 event occurred after the April 4th, 2010 earthquake when neighboring Well 6 became artesian and began spilling into the area next to Well 4.

Due to these combined factors, the Division has determined that Well 4 is most likely GWUDI. Wells determined to be GWUDI must meet the requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which includes treatment, monitoring and reporting.

Well 4 pumps into a dedicated 1,400-transmission pipeline that delivers the flow split evenly into the Water System's two reservoirs. In the attached CT calculation document, the Division performed chlorine contact time (CT) calculations to determine the level of inactivation achieved in the Water System's reservoirs prior to entering the distribution system. The calculation looked at the maximum monthly demand (MMD) values provided in the electronic annual report to the Division. These values were used to calculate the Maximum Day Demand (MDD) and Peak Hourly Demand (PHD) to determine the chlorine contact time achieved in the smaller reservoir (0.24 MG). Calculations were performed based on the assumption that the reservoirs were full, the chlorine dose maintained a residual of 1.0 mg/L, and the flow rate leaving the two reservoirs were equal. CT tables for typical water conditions indicate the Water System must complete 37 mg-minutes of contact time to achieve 1.0-log Giardia inactivation through chlorination. Review of the 2014 and 2015 system demand data indicates that the system would achieve a 1.0-log Giardia inactivation safety factor (CT achieved/CT required) range of 3-7 during all flow conditions.

Action Item:

Per Permit 05-14-02P-015: Provision 3: the Water System must provide continuous chlorination of Well 4 in order to provide a chlorine residual in their distribution system. Furthermore, a minimum chlorine residual of 1.0 mg/L shall be maintained in the effluent of the storage tanks at all times.

2. **Sources: Well 8**

Per Permit Amendment 05-14-13PA-004, dated April 8th, 2013,

> "The primary source will be Well 8 once removal treatment for iron and manganese is installed and Well 4 will become the emergency backup well. Until then, Well 4 is the approved active source and Well 8 shall be used as a standby source only during emergencies."

2009 analysis of a Well 8 water sample test indicated manganese levels of 196 ug/L, which is above the Maximum Contaminant Level (MCL) of 50 ug/L. Provision 10 of Permit Amendment 05-14-13PA-004 stated the following:

> "Jacumba shall submit a permit amendment application including plans and specifications for the addition of iron and manganese removal treatment to CDPH within twelve (12) months of issuance of this permit amendment."

The Water System submitted a preliminary engineering report (PER), dated March 8th, 2013, that listed three alternatives for the project:

1. Do Nothing.
2. Install iron and manganese treatment for Well 8.
3. Install iron and manganese treatment for Well 8, additional pumping capacity at Well 7, a solar power grid, and the destruction of Wells 1, 2, 3 & 5.

The PER selected Alternative 3, but did not provide any plans or design specifics for the proposed treatment system or details on its operation. The Division accepted the PER as a 10% concept design document, but still requires a full engineering report to describe the proposed iron and manganese treatment plant design. The Water System experienced delays in funding the engineering report due to difficulties in finalizing the property rights for the site. In 2015, the site was purchased, finalizing the property rights issues. The Water System is currently pursuing USDA Rural Development funding for the design and installation of the iron and manganese treatment plant.

Action Item:

By June 30, 2016, please submit a project update on funding status. Thereafter, the Water System must submit quarterly updates, until project completion, on the status of funding, design, and construction. The Well 4 & 8 deficiencies will be addressed in further detail under a separate cover letter.

2. Well 4: Well Liner Condition

In November 2015 the pump on a Well 4 was removed from service due to pump failure. While the pump was removed, the well casing was examined and found to have severe interior flaking rust. The company performing the pump replacement provided Jacumba an estimate for placing a six-inch liner within the existing well casing and installing a gravel pack. The estimate was reviewed and approved by the Jacumba Waterboard in March 2016.

Action Item:

By June 30, 2016, please provide confirmation that all materials used in the well lining project will meet the NSF 61 standard and that the well will be disinfected and bacteriological confirmation sampling done per AWWA standard C654.

3. Well 4: Bacteriological Sample Site

During the 2013 and 2016 inspections, it was noted that the Well 4 raw source sample tap is a threaded faucet that is approximately 6-inches above the ground. This sample location has had historic total coliform positives during the wet weather season. The proximity of this sample tap to the ground, as well as the difficulty in disinfecting threaded sample taps, may play a role in this cycle of positive total coliform results.

Action Item:

By July 1, 2016, Jacumba must replace the threaded sample tap with a non-threaded dedicated water quality sample tap, and move the sample location higher above the ground. Section 10, Figure 7 of the Department of Water Resources Bulletins 74-81 and 74-90, suggests placing the sample tap 3-feet above the slab, see link below. Additionally, Title 22, §64560(c)(3)(E)(2) requires that the well be equipped with:

> "A non-threaded down-turned sampling tap located on the discharge line between the wellhead and the check valve. Sampling taps used for

obtaining samples for bacteriological analysis shall not have a screen, aerator, or other such appurtenance;"

http://www.water.ca.gov/groundwater/well_info_and_other/california_well_standards/wws/wws_combined_sec10.html

4. Well 4 Water Quality Analysis

A review Jacumba's water quality data indicates the analysis performed on the nitrate sample taken in December 2015 has not been EDT'd by the Water System's laboratory.

Action Item:
The Water System must include the PS code and clearly callout that the analysis must be EDT'd on all laboratory analysis chain of custody forms, with the exception of bacteriological analysis.

Action Item:

By June 30, 2016, Jacumba must contact their laboratory to confirm that the December 2015 nitrate sample results were sent via EDT using PS Code 3710011-004.

5. Well 4 Water Quality Analysis: Volatile Organic Compounds (VOCs)

The Water system monitored Well 4 for VOCs in 2001, 2008, 2011, 2013, and 2015, and was non-detect for all regulated VOC analytes. Initial monitoring consisting of four quarterly samples were collected in 2001 for MTBE and MTBE has been sampled in 2003, 2006, 2008, 2011, 2013, and 2015, and was non-detect for MTBE. Well 4 does not meet DWR Well Standards as it does not have a 50-foot seal and the groundwater table is only approximately 10-feet from the surface. There are also two historical leaking underground storage tanks (now closed) and a permitted underground storage tank located between two and five years travel time from the well. Well 6, now and agricultural well, has had detects of toluene and benzene in 2006 for which no follow-up sampling has been completed.

In the attached memo "Former Chevron Service Station No. 20-5934, 44485 Old Highway 80 Jacumba, California 92065 – Comments on Corrective Action Plan (CAP) for Natural Attenuation and Request For Closure UAR #H29832-002", dated April 28, 2016 the water system raised objections to the CAP recommendation that the former gas station site "meets the criteria under the Low-Threat Underground Storage Tank Case Closure Policy (LTCP) adopted by the State Water Board" (CAP Memo). The Division has reviewed the Water

System's objections to the CAP recommendations and revisited the Source Water Assessment for Well 4.

Per the Water System's the Source Water Assessment, the Chevron plume site is within 900 feet of Well 4, which is within the two-year time of travel to the well site. Due to the concerns raised in the CAP Memo and proximity to the Well, the Division is increasing the VOC monitoring frequency at Well 4 from triennial to annual.

Action Item:
By December 31, 2016, the Water System must sample Well 4 for VOCs, and annually thereafter.

6. Bacteriological Sample Sites: Reservoirs

During the 2013 and 2016 inspections the Division noted hoses connected to both of the reservoirs that lacked anti-siphon backflow prevention devices. These hoses are used for maintenance activities around the reservoir site, and for supplying water to wildlife.

Action Item:

By June 30, 2016, Jacumba must install anti-syphon backflow prevention devices onto the faucets.

7. Emergency Generators

During the 2016 inspection Water System staff informed the Division that the EPA has informed the system that their emergency diesel generators will not meet the air pollution control standards that go into effect in two years. Jacumba has no interties with neighboring water systems, and is susceptible to power loss related water outages.

Recommendation:

The Division recommends that the Water System develop a plan for the replacement of their emergency power supply.

8. Distribution Operator Staff

During the 2016 inspection the Division noted that the majority of day-to-day operations and system oversight is performed by an uncertified water technician under the oversight of the Water System's certified distribution operator. Only having one certified operator on staff makes it difficult to schedule vacations, have holidays, or have adequate coverage while operator is out on sick leave. CCR, Title 22 §64413.7 (c) states "The chief operator or

shift operator shall be on-site or able to be contacted within one hour." Additionally, the Water System's emergency notification plan and electronic annual report to the Division only contain a single point of contact. The water technician's contact information should be included in that information.

Recommendation:

The Division recommends that the Water System establish a greater degree of oversight by having the water technician certified as a D1 distribution operator. Additionally, the Division recommends that the water technician's contact information be included on the emergency notification plan.

Please respond in writing **by June 30, 2016** regarding when and how the deficiencies outlined above will be addressed. If you have any questions regarding any of the items discussed above, please feel free to contact Mr. Scott Ketcham or me at (619) 525-4922.

Sincerely,

Sean Sterchi, P.E.
District Engineer

Enclosures:
1. Emergency Notification Plan
2. CAP Memo
3. SWAP Map
4. CT Calculations

cc: Keith Kezer, Program Coordinator, San Diego County Department of Environmental Health

APPENDIX B

2013 Sanitary Survey and Well 8
Permit Amendment

State of California—Health and Human Services Agency
California Department of Public Health

Ron Chapman, MD, MPH
Director & State Health Officer

EDMUND G. BROWN JR.
Governor

October 8, 2013

Debby Troutt
General Manager
Jacumba Community Sanitation District
1266 Railroad St
Jacumba, Ca 91934

Dear Ms. Troutt:

JACUMBA COMMUNITY SANITATION DISTRICT, SYSTEM NO. 3710011
2013 SANITARY SURVEY

The purpose of this letter is to provide a summary of deficiencies and recommendations for the sanitary survey conducted by Mr. Scott Ketcham on September 24th, 2013 for Jacumba Community Sanitation District (Jacumba) water system. For greater detail on each of the elements discussed below, please feel free to contact me or Mr. Ketcham for a conference call or meeting.

Sanitary Survey Deficiencies:

1. **Well 8 Water Treatment Plant**

Provision 10 of Jacumba's April 8th, 2013 Permit Amendment 05-14-13PA-004 stated the following:

> "Jacumba shall submit a permit amendment application including plans and specifications for the addition of iron and manganese removal treatment to CDPH within twelve (12) months of issuance of this permit amendment."

The last submittal for this project was the preliminary engineering report (PER), dated March 8th, 2013. The PER listed three alternatives for the project:

1. Do Nothing.
2. Install iron and manganese treatment for Well 8.
3. Install iron and manganese treatment for Well 8, additional pumping capacity at Well 7, a solar power grid, and the destruction of Wells 1, 2, 3 & 5.

Division of Drinking Water and Environmental Management
1350 Front Street, Room 2050 San Diego, CA 92101
(619) 525-4159 (619) 525-4383 Fax
Internet Address: www.cdph.ca.gov

The PER selected Alternative 3, but did not provide any plans or design specifics for the proposed treatment system or details on its operation.

Action Item:

By December 31, 2013, please submit a project update including 30% or greater plans and specifications along with a draft project schedule for the iron and manganese treatment plant project. If Jacumba is unable to meet this deadline, please contact CDPH to coordinate a meeting or conference call to discuss.

2. Well 6

Provision 18 of Jacumba's April 2013 Permit Amendment 05-14-13PA-004 stated the following:

> "Jacumba shall destroy Well 6 using methods in conformance with the Department of Water Resources California Well Standards within twelve (12) months of issuance of this permit."

Since the permit amendment was issued Jacumba has begun using Well 6 for non-potable construction purposes. In order to continue using the source in this manner, Jacumba has requested CDPH reclassify the well as an agriculture source.

Well 6 is sited in a deep fractured rock aquifer that is under volcanic influence. Well 6 has MCL violations for odor threshold, fluoride, and toluene. Additionally, Well 6 has a pH of 9.5, a temperature of 95° F, and a strong sulfuric odor. These water quality characteristic indicate that the aquifer for Well 6 is not same aquifer feeding the adjacent potable sources, Wells 4 & 8. Jacumba has been using Well 6 as a construction source for several years, and monitors the amount of water used daily and the water surface elevation monthly. Jacumba also has been monitoring the effects of pumping Well 6 on Wells 4 and 8, and no impacts on performance of these wells have been noted.

During the inspection CDPH confirmed that Well 6 is not connected to the potable water system, and that the construction tanker fill site is sufficiently air gapped.

CDPH hereby approves Jacumba's request to change the source class designation of Well 6 from inactive to agricultural, contingent on the following provisions:

1. Well 6 is no longer an approved as a source of supply for Jacumba, and shall remain physically disconnected from the potable water distribution system.

2. Jacumba shall ensure that Well 6 is maintained in a condition that prevents surface water runoff or any other contamination from entering into the well.
3. Jacumba shall submit a permit application and receive CDPH approval prior to reactivating Well 6 as a potable source.
4. Jacumba must continue to monitor and maintain records of usage of Well 6 to ensure that pumping rates do not exceed the Well's safe yield or negatively impact Jacumba's ability to meet potable water demands.

3. Well Destruction

Jacumba has two inactive wells and two abandoned wells. The historic record for all four of these sites does not appear to indicate that the wells were abandoned in accordance with Department of Water Resources Bulletins 74-81 and 74-90.

- Wells 3 & 5 are both inactive wells that are 100 feet and 300 feet east, respectfully, of the system's primary well, Well 4.
- Wells 1 & 2 are abandoned wells within 1 mile of the active well sites.

In Jacumba's 2010 sanitary survey CDPH included the following action item.

> **"By December 31, 2010**, must submit a plan for the destruction of Wells 1, 2, 3 & 5 in accordance with Bulletins 74-81 and 74-90."

However, Jacumba has taken no action to destroy Wells 1, 2, 3 & 5. The table below lists a complete inventory of the Jacumba's wells.

Well	***Status***	***Capacity gpm***
1	Abandoned	-
2	Abandoned	-
3	Inactive	-
4	Active	200
5	Inactive	-
6	Standby	600
7	Monitoring	-
8	Standby	200
Total Capacity		200

Action Item:

By March 31, 2014, Jacumba must submit an updated CIP that includes a budgeted plan for destroying Wells 1, 2, 3 & 5 in accordance with Bulletins 74-81 and 74-90, Chapter 2, Section 23. See web link below. If Jacumba needs

assistance with developing a CIP and/or rate study, please contact CDPH for an assistance referral to our 3rd party contractors, e.g. CRWA, etc.

http://www.dpla.water.ca.gov/sd/groundwater/california_well_standards/wws/wws_combined_sec23.html

4. Cross Connection:

1. During the cross connection portion of the inspection CDPH noted that a 1-inch irrigation PVC single check valve, an unapproved backflow prevention device, was installed at the Jacumba Spa (Spa) service connection. Additionally, pursuant to Section 64591, Title 22, of the CCR, a water system shall not use any product that may come into contact with the drinking water that has not been tested and certified as meeting the specifications of NSF International/ American National Standard Institute (NSF) 61. The backflow prevention device currently being used by the Spa does not meet NSF 61 or CCR, Title 17, §7601 criteria.

   Jacumba's records indicate that on January 8th, 2013, the Spa was given a 30-day notice to install a reduced pressure principle backflow prevention (RP) device. This period coincides with Jacumba activating the Spa's service connection. However, after the 30-day period expired Jacumba did not follow up with a service disconnection warning letter and the Spa did not install an approved RP device.

   Action Item:

   By November 15, 2013, Jacumba must submit a summary of the cross connection control program status including actions taken or planned for customers not in compliance with Jacumba's program rules or ordinances.

   Recommendation:

   CDPH recommends that Jacumba consider revising the cross connection control program shutdown notification procedures to include additional notifications beyond the current 30-day shutdown notice, e.g. 14-day, 7-day, and final 24 – hour notice letters prior to inactivating service connections.

   Please note the air gap at the Well 6 construction fill site must be accounted for on future Annual Report to the Drinking Water Program submittals.

5. Vents

The vent screen on the 403,000 Reservoir has settled and has a ½" gap above the screen. This gap is sufficient to allow bats, birds, and insects enter into the

reservoir. Additionally, the insect screen on Well 4's vent is no longer structurally intact and is no longer sufficient to serve as an insect barrier.

Action Item:

By November 29, 2013, Jacumba must submit to CDPH photographic proof of repairs to the aforementioned screens. Repairs must be made with size 8 or finer insect-proof non-corrosive screen.

Recommendation:

CDPH recommends that Jacumba visually inspect of all of the system's vent screens on a monthly basis.

6. Bacteriological Sample Sites: Reservoirs

At both Reservoirs CDPH noted hoses attached to the bacteriological sample sites. If Jacumba elects to keep the hoses on at these sample locations, then anti-syphon backflow prevention devices must be installed onto the faucets. However, these sample locations are intended to be repeat sample sites that would be used in the event of a total coliform or E. coli positive routine sample and threaded sample taps can be difficult to thoroughly disinfection.

Recommendation:

CDPH recommends that Jacumba replaces the threaded sample taps with non-threaded dedicated water quality sampling taps.

7. Bacteriological Sample Sites: Well 4

At Well 4 CDPH noted the raw source sample tap is a threaded faucet that is approximately 6-inches above the ground. After rain events this well site routinely has total coliform positive results. The proximity of this sample tap to the ground, as well as the difficulty in disinfecting threaded sample taps, may play a role in this cycle of positive total coliform results.

Recommendation:

CDPH recommends that Jacumba replaces the threaded sample tap with a non-threaded dedicated water quality sample tap, and move the sample location higher above the ground. Section 10, Figure 7 of the Department of Water Resources Bulletins 74-81 and 74-90, suggests placing the sample tap 3-feet above the slab, see links below. Additionally, Title 22, §64560(c)(3)(E)(2) requires that the well be equipped with a non-threaded down-turned sampling tap located on the discharge line between the wellhead and the check valve.

http://www.dpla.water.ca.gov/sd/groundwater/california_well_standards/wws/wws_combined_sec10.html

http://www.dpla.water.ca.gov/sd/groundwater/california_well_standards/figures/74-81fig7.jpg

8. Well 4 Water Quality Analysis

A review Jacumba's water quality data indicates that gross physical constituents were not analyzed in the May 2013 Well 4 sample. In order to overcome this oversight Jacumba took an additional sample on September 16th, 2013.

Action Item:

By November 29, 2013, Jacumba must contact their laboratory to confirm that the sample results were sent via EDT to PS Code 3710011-004 and submit a hard copy of the analysis to CDPH.

Please respond in writing **by November 15, 2013** regarding when and how the deficiencies outlined above will be addressed. If you have any questions regarding any of the items discussed above, please feel free to contact Mr. Scott Ketcham or me at (619) 525-4922.

Sincerely,

Sean Sterchi, P.E.
District Engineer

cc: Mark McPherson, Chief of Land and Water Quality Division, San Diego County Department of Environmental Health

State of California—Health and Human Services Agency
California Department of Public Health

RON CHAPMAN, MD, MPH
Director & State Health Officer

EDMUND G. BROWN JR.
Governor

April 8, 2013

Debbie Troutt
General Manager
PO Box 425
Jacumba, CA 91934

Dear Ms. Troutt:

JACUMBA COMMUNITY SERVICES DISTRICT, SYSTEM NO. 3710011
WELL 8 PERMIT AMMENDMENT (NO. 05-14-13PA-004) REVISION

The California Department of Public Health (CDPH) has issued a revised domestic water supply permit amendment for the Jacumba Community Service District. The permit amendment and engineering report are enclosed. Please advise CDPH in writing within 30 days if you do not agree to the permit or the permit conditions.

If you have any questions regarding this letter, please contact Nadine Evans at (619) 525-4646.

Sincerely,

Sean Sterchi, P.E.
District Engineer

Enclosure:
(1) Permit 05-14-13PA-004 (Revision)
(2) Engineering Report (Revision)

cc: Mark McPherson, Chief of Land & Water Quality Division, County of San Diego, Department of Environmental Health (w/o attachments)

Southern California Drinking Water Field Operations Branch
1350 Front St., Room 2050, San Diego, CA 92101
Telephone (619) 525-4159 (619) 525-4383 Fax
Internet Address: www.cdph.ca.gov

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
DIVISION OF DRINKING WATER AND
ENVIRONMENTAL MANAGEMENT

DRINKING WATER FIELD OPERATIONS BRANCH
SAN DIEGO DISTRICT

JACUMBA COMMUNITY SERVICES DISTRICT

WELL 8

WATER PERMIT NO. 05-14-13PA-004 (REVISION)
System No.: 3710011
San Diego County

April 2013

STATE OF CALIFORNIA

AMENDMENT TO THE DOMESTIC WATER SUPPLY PERMIT

ISSUED TO

Jacumba Community Services District
System No. 3710011

PERMIT AMENDMENT NO.: 05-14-13PA-004 **DATE: April 8, 2013 (Revision)**

ORIGINAL PERMIT NO.: 05-14-02P-015 **DATE: December 30, 2002**

WHEREAS:

1. Jacumba Community Services District (hereinafter Jacumba) submitted an application to the California Department of Public Health (hereinafter CDPH) on March 14, 2012 for an amendment to the Domestic Water Supply Permit (No. 05-14-02P-015) issued to Jacumba on December 30, 2002.

2. The purpose of the amendment is to allow Jacumba to make the following modifications to the public water system:

   a) add Well 8 as an approved standby raw water source
   b) inactivate Well 6

3. Jacumba has submitted all of the supporting information required to evaluate the application.

4. CDPH has evaluated the application and the supporting material and has determined that the proposed modifications comply with all applicable State drinking water requirements.

THEREFORE:

1. CDPH hereby approves the application submitted by Jacumba for a permit amendment. The Domestic Water Supply Permit (05-14-02P-015) issued to

Jacumba on December 30, 2002, is hereby amended to inactivate Well 6 and add Well 8 as an approved standby source of raw water supply.

2. This permit amendment is subject to the following conditions:

GENERAL PROVISIONS

1. Jacumba shall comply with all the requirements set forth in the California Safe Drinking Water Act, California Health and Safety Code and any regulations, standards or orders adopted thereunder.
2. The only approved sources for Jacumba are listed below:

Table 1 – Approved Sources

Source	Status	Capacity	PS Code
Well 4	Active Raw	200 gpm	3710011-004
Well 8	Standby	200 gpm	3710011-009

3. The only approved treatment is disinfection by 12.5% sodium hypochlorite solution.
4. No changes, additions, or modifications shall be made to the sources or treatment mentioned in Provision Nos. 2 and 3 unless an amended water supply permit has first been obtained from CDPH.
5. All water supplied by Jacumba for domestic purposes shall meet all Maximum Contaminant Levels (MCLs) established by CDPH. If the water quality does not comply with drinking water standards, additional treatment shall be provided.
6. Pursuant to Section 64590, Title 22, of the California Code of Regulations (CCR), no chemical or product shall be added to drinking water by a water supplier unless the chemical or product is certified as meeting the specifications of NSF International/ American National Standard Institute (NSF/ANSI) 60(Drinking Water Treatment Chemicals-Health Effects).
7. Pursuant to Section 64591, Title 22, of the CCR, a water system shall not use any chemical, material, lubricant, or product that may come into contact with the drinking water that has not been tested and certified as meeting the specifications of NSF/ANSI 61.
8. All persons responsible for the operation and maintenance of the water system shall be certified in accordance with Sections 63750.1 through 64413.7, inclusive, Title 22, of the CCR. In accordance with these requirements, Jacumba shall employ operator(s) that hold the minimum distribution certification issued by the State of California, listed in the following table:

Table 2 – System Classification

Water System Name	Distribution System Classification	Chief Distribution Operator Minimum Certification	Shift Distribution Operator Minimum Certification
Jacumba Community Services District	D1	D1	D1

WELL 8 TREATMENT REQUIREMENTS

9. The standby status of Well 8 shall not be changed to an active source of drinking water supply, unless treatment is provided to meet all existing drinking water standards and prior approval is obtained from CDPH. Specifically, Well 8 shall have continuous reliable disinfection installed and manganese removal treatment shall be provided.

10. Jacumba shall submit a permit amendment application including plans and specifications for the addition of iron and manganese removal treatment to CDPH within twelve (12) months of issuance of this permit amendment.

WELL 8 OPERATIONAL REQUIREMENTS

11. Jacumba shall submit an Operations Plan for Well 8 including provisions 12-15 as stated below a start-up plan that addresses flushing to waste to ensure that slugs of high iron and manganese do not enter the distribution system, and bacteriological and chemical monitoring and reporting requirements.

12. Well 8 shall not be used more than 15 days a year or more than 5 consecutive days per the limitations of use in conformance with Title 22, CCR Section §64414 (c).

13. Public notification shall be provided to customers served by Well 8 prior to use of the well when the use is planned or within 24 hours of placing the well into service for an unplanned emergency. The notification shall include the following at a minimum:

    a. Explanation of water quality and aesthetic effects of iron and manganese,

    b. Reason for use of the well

    c. Anticipated duration of use of the well

    d. Most recent iron and manganese results from the well

14. Within 3 days after the short-term emergency use of a Well 8, Jacumba shall notify CDPH. The notification shall include information for the reason and

duration of use along with proof of public notification required under Provision #13 above.

15. Jacumba shall flush a minimum of two casing volumes prior to placing Well 8 into service. Jacumba shall collect a raw source water bacteriological sample prior to placing the well into service for planned use or upon placing the well into service in an emergency. After 24 hours of operation, Jacumba shall sample for iron and manganese from Well 8.

WELL 6 INACTIVATION

16. Well 6 is no longer approved as a source of supply for Jacumba, and shall remain physically disconnected from the potable water distribution system.

17. Jacumba shall ensure that Well 6 is maintained in a condition that prevents surface water runoff or any other contamination from entering into the well.

18. Jacumba shall destroy Well 6 using methods in conformance with the Department of Water Resources California Well Standards within twelve (12) months of issuance of this permit.

19. If Jacumba chooses to reactivate Well 6, treatment must be installed and Jacumba shall submit a permit application to CDPH for approval prior to use.

20. Well 6 is hereby waived from the water quality monitoring requirements pursuant to Title 22, Division 4, Chapter 15.

GROUNDWATER BACTERIOLOGICAL MONITORING

20. Jacumba shall monitor the raw source water bacteriological quality, prior to chlorination, on a monthly basis for all groundwater wells operating during the month.

21. All raw source water coliform samples collected at the groundwater wells shall be analyzed using an enumeration method and designated as "special" samples and will not be counted for compliance with the routine distribution system coliform monitoring requirements.

22. All total coliform-positive raw water quality samples shall be analyzed for fecal coliform or E. coli bacteria.

23. Jacumba shall notify CDPH within 24-hours if total coliform-positive or E. coli-positive samples have been obtained from a groundwater well and provide CDPH all follow-up sampling results.

24. Jacumba shall take a coliform sample from any active wells within 24 hours of receiving a distribution system coliform positive in accordance with the Ground Water Rule.

25. Jacumba shall submit an updated Bacteriological Sample Siting and Ground Water Rule Plan to CDPH by May 31, 2013.

26. Groundwater wells that produce raw water containing coliform bacteria shall be removed from service following the collection of a confirmation raw water sample from the well. The raw water sample shall be analyzed for coliform and heterotrophic bacteria. If removal of the well from service may result in a water outage or failure of a drinking water standard, Jacumba shall contact CDPH to discuss interim requirements for the use of this source.

27. Wells that have the confirmation raw water sample from Provision #24 above that is coliform positive shall be removed from service, disinfected, pumped to waste until zero chlorine residual is obtained, and re-sampled after 24 hours for coliform and heterotrophic bacteria using the cycle test procedure. All re-samples shall be negative for coliform and have a heterotrophic plate count (HPC) less than 500 colonies/mL prior to placing the source back into service. If removal of the well from service may result in a water outage or failure of a drinking water standard, Jacumba shall contact CDPH to discuss interim requirements for the use of this source.

28. Jacumba shall comply with the Ground Water Rule (GWR). For each Total Coliform Rule (TCR) distribution system monitoring sample result that is coliform positive, Jacumba shall collect a sample from each active well and analyze for E. coli within 24-hours of learning of the TCR coliform positive. Jacumba shall collect at least one sample from each active well in use at the time the TCR total coliform positive monitoring sample was collected. Jacumba shall conduct Tier 1 Public Notification if a well monitoring sample is E. coli positive.

29. Groundwater wells removed from service for repair and/or maintenance activities shall be disinfected and the raw water tested for coliform and heterotrophic bacteria prior to placing the wells back into service. Groundwater wells shall not be placed back into service to supply the potable water system unless the laboratory results show that the wells are coliform absent.

GROUNDWATER WELL CHEMICAL MONITORING

30. Jacumba shall complete the required source water monitoring Sections 64431-64450, Title 22, CCR. All analyses required for compliance shall be performed by a State-certified laboratory and shall be submitted via Electronic Data Transfer (EDT). The monitoring matrix is included in **Attachment 6** of the Engineering Report.

31. Jacumba shall conduct all inorganic, organic, and radiological monitoring once every compliance cycle, 9 years, unless a waiver has been granted by CDPH pursuant to Sections 64432 (k) or (l) for inorganics, or Sections 64445 (d) for organics.

32. Jacumba shall complete initial Perchlorate monitoring before use of Well 8 as a standby source.

RECORDS AND REPORTING

33. Jacumba shall record the water production output and static and pumping groundwater levels for each well source on a monthly basis at a minimum. Written water production and groundwater depth records shall be maintained by Jacumba for a minimum of ten years and be available to CDPH representatives upon request.
34. Monthly laboratory reports of distribution (for TCR compliance) and raw water bacteriological analysis from each well source operated by Jacumba shall be mailed to CDPH directly by the laboratory by the tenth day of the following month.
35. Jacumba shall have the lab submit chemical water quality data to CDPH using Electronic Data Format (EDF) using the Primary Station Codes listed in Provision #2 of this permit. The PS Code for Well 8 is 3710011-009.

This amendment shall be appended to and shall be considered to be an integral part of the Domestic Water Supply Permit issued to Jacumba Community Services District on December 30, 2002.

FOR THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

4/8/13
(Date)

(Signed District Engineer)

Engineering Report
For Consideration of the Permit Application From
JACUMBA COMMUNITY SERVICES DISTRICT
Serving San Diego County

California Department of Public Health
Drinking Water Field Operations Branch
San Diego District

System No. 3710011
April 8, 2013

Report Prepared By: _____
Nadine Evans, P.E.
Associate Sanitary Engineer

Report Reviewed By: _____
Sean Sterchi, P.E.
District Engineer

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PURPOSE OF REPORT

By application dated March 14, 2012, Jacumba Community Services District (hereinafter Jacumba) applied for a permit amendment to inactivate Well 6 and add Well 8 as a new potable water source **(Attachment No. 1)**. The purpose of this report is to document the sanitary engineering review and make recommendations regarding issuance of an amended domestic water supply permit.

1.2 BACKGROUND INFORMATION

Jacumba is a community water system that supplies water for domestic purposes to approximately 530 residents through 239 service connections to the town of Jacumba, an incorporated area of San Diego County. Jacumba currently operates under California Department of Public Health (hereinafter CDPH) permit 05-14-02P-015 issued on December 30, 2002. Jacumba has only one approved active source, Well 4. The second back up source, Well 6, has been disconnected from the system due to poor water quality. New groundwater community water systems are required by Waterworks Standards to have a minimum of two source wells and existing systems should have the same, i.e. at least one backup source for system reliability. Although the new Well 8 does not meet all water quality standards, special consideration is being given to allow it to be used as a standby source during emergencies to ensure system reliability.

Well 4 and Well 8 are located at the western end of the community that is north of Old Highway 80 and west of Railroad Ave. Well 4 does not have any maximum contaminant level (MCL) violations, but has a pattern of total coliform events. In the past decade, Well 4 has had a dozen total coliform positives. Factors of Well 4's physical location, soil type, and lack of an adequate sanitary seal (the well is 40 feet deep and the seal is 10 feet deep) increase the health hazard of using Well 4. In the 2010 sanitary survey of Jacumba by CDPH, concern was expressed that Well 4 may be groundwater under the direct influence of surface water (GWUDI) and therefore must meet the requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2). The primary source will be Well 8 once removal treatment for iron and manganese is installed and Well 4 will become the emergency backup well. Until then, Well 4 is the approved active source and Well 8 shall be used as a standby source only during emergencies.

Jacumba maintains two different pressure zones with 1 booster station and 1 reservoir for storage of potable water. Jacumba has no interconnections with any other water system. According to the 2011 Annual Report to CDPH, Jacumba provided a total of 21.38 MG of potable water from the groundwater well. Jacumba's approved sources are listed in Table 1. Table 2 lists wells that were previously sources of supply in the system but have since been inactivated. All

of the sources listed in Table 2 have been physically disconnected from the system.

Table 1 – Approved Sources

Source	Status	Capacity	PS Code
Well 4	Active Raw	200 gpm	3710011-004
Well 8	Standby	200 gpm	3710011-009

Table 2 – Inactive Sources

Source	Year Inactivated	PS Code
Well 1	1995	3710011-001
Well 2	1995	3710011-002
Well 3	1995	3710011-003
Well 5	1995	3710011-005
Well 6	2012	3710011-006
Well 7	2009	3710011-008

1.3 BRIEF DESCRIPTION OF THE PROJECT

Well 8 was constructed in 2008 to add an additional groundwater source for Jacumba. Well 8 is located at 44310 Old Hwy 80 in Jacumba, California. Well 8 is situated in a fractured bedrock aquifer just west of the Jacumba Valley Groundwater Basin. The well is 524 feet deep with screened intervals entirely within the crystalline bedrock.

Well 6 has high water temperature (94 °F), pH of 9.48, fluoride over the MCL, and strong smell of hydrogen sulfide. Jacumba submitted a photograph to CDPH that shows Well 6 has been physically disconnected from the distribution system, which has left Jacumba with only one CDPH approved active well source, Well 4. Jacumba appears to able to meet the Maximum Day Demand at all times as required in the California Water Works Standards without Well 6 as discussed below in the Sources of Supply section of this report.

Pump testing showed that Well 8 can produce 200 GPM. Well 8 is approximately 390 yards from active Well 4. A site map is included in **Attachment No. 2**. Well 8

does not meet the water quality standards for manganese. However, Well 8 will be permitted by CDPH as a standby source with provisions to ensure Jacumba has a minimum of two approved well sources.

1.4 FACILITIES

Jacumba's water system consists of two wells, a 0.24 million gallon (MG) and a 0.43 MG bolted steel storage tank, two pressure zones, one booster station and hydro-pneumatic tank, six inch transmission line from well field to reservoir and from reservoir to distribution system, three reduced pressure backflow preventer (RPP) devices and 239 service connections.

Jacumba has proposed an iron and manganese removal treatment facility to treat well water from Well 8 and have it permitted as a permanent active source. The facility would consist of 3 or 4 manganese dioxide filters; a backwash flow rate provided by the well pump of 100-250 gpm; a backwash water pond; and a water quality objective of manganese removal to <0.01 mg/L. Jacumba has submitted an application to USDA for funding for the manganese treatment system and submitted a preliminary engineering report. The project as a whole will compete for funding from next years' allocation from USDA-RD.

1.5 SOURCES OF INFORMATION

Information for this report was obtained from previous General Manager Tom Lindenmeyer, current General Manager Debra Troutt, the drinking water source assessment, water quality laboratory reports, annual reports, and other technical information submitted by Jacumba with the permit amendment application.

II INVESTIGATION AND FINDINGS

2.1 SOURCES OF SUPPLY

The community of Jacumba primarily overlies Jacumba Valley, under which is the Jacumba Valley Groundwater Basin. This alluvial groundwater basin is bounded by faults on the east and west and on the north and south by crystalline rocks. Several springs, including hot springs, are located within the basin. Boundary Creek, which enters the basin from the west, contributes much of the surface water recharge to the basin.

A 6-inch polyvinyl chloride (PVC) transmission line connects Well 8 to the existing 6-inch ductile iron pipe (DIP) transmission line from Well 4 to the water storage tanks. There is wellhead disinfection at Well 4 but there is no disinfection at Well 8 and there are no service connections between the wells and the storage tanks. This configuration does not allow Well 8 to be disinfected when Well 4 is not in use; therefore, continuous reliable disinfection at the wellhead of

Well 8 must be installed. Key construction parameters for Well 8 are listed in Table 3 below, and the Well Datasheet is included in **Attachment No. 3.**

Table 3 – Well Construction Summary

Source Name	Well 8
PS_Code	3710011-009
Status	Active
Well Capacity	200 GPM
Well Depth (ft bgs)	524
Sanitary Seal Depth (ft bgs)	130
Depth to Perforations (ft bgs)	153
Casing Diameter (inches)	12
Gravel Pack (Y/N)	Y
Pump-to-Waste Disch.	Y
Pump Type	Submersible
Motor HP	35
Pump Setting Depth	440
Lubrication	Water
Power	Electric
Auxiliary Power	Yes, diesel
Water Quality Issues	Elevated Manganese
Meets Construct. Stds.	Yes
Meets Min. Separation	Yes

Capacity Evaluation

The yield of Well 4 has been rated at 200 gallons per minute and Jacumba has 670,000 gallons of storage capacity. These two elements provide the system with a total source capacity of 958,000 gallons per day.

The California Waterworks Standards requires public water systems to have the capacity to meet the system's Maximum Day Demand (MDD) at all times, and systems with less than 1,000 service connections to meet the MDD with storage capacity. MDD is determined based on the highest MDD reported for the last 10 years; however, only 5 years of data was reviewed for Jacumba. Based on this information, Jacumba's reported MDD of 210,000 gallons occurred in August of 2007.

Based on a total storage capacity of 670,000 gallons, Jacumba has the ability to meet MDD, as required by the California Waterworks Standards, provided the reservoirs are at full capacity.

Based on Jacumba's reported Maximum Day Demand (MDD) of 210,000 gallons for August of 2007, the PHD can be calculated. PHD is determined by dividing the MDD by 24 hours and applying a peaking factor of 1.5. For August 2007, the calculated PHD is 13,125 gallon / hour (gph) (210,000 gallons/ 24 hours x 1.5).

Jacumba's total source capacity is 12,000 gph and the total storage capacity is 167,500 gph (670,000 gallons/4 hours under PHD conditions). Therefore, Jacumba's total source capacity under PHD is 179,500 gph (12,000 gph + 167,500 gph). Based on the calculated total source capacity, Jacumba has the ability to meet PHD for at least four hours (179,500 gph is greater than 13,125 gph).

2.2 SOURCE WATER QUALITY

Water samples were taken from Well 8 on February 27, 2009 for the analysis of general mineral, inorganics, volatile organics, and received by the Institute for Environmental Health (IEH) Environmental Engineering Laboratory, Inc. (EEL) on February 27, 2009 (reported on March 30, 2009). The results indicate that Well 8 currently meets all Primary and Secondary Drinking Water Standards except manganese. The Well 8 water sample test result for manganese is 196 ug/L which is above the Maximum Contaminant Level (MCL) of 50 ug/L. An initial perchlorate sample was not reported. A sample for perchlorate must be taken and reported before using Well 8 as a standby well. Bacteriological samples must be taken and the results must be absent for total and fecal coliform before the well can be permitted for use. All water quality results must be electronically submitted to the CDPH database by the lab using the primary station code (PS Code) assigned the source. The PS code for Well 8 is 3710011-009.

A summary of the initial chemical water quality monitoring results for Well 8 is included in **Attachment No. 5.**

2.3 SOURCE WATER ASSESSMENT

Jacumba completed the Drinking Water Source Assessment for Well 8 in August 2009. The source is considered most vulnerable to the following activities not associated with any detected contaminants: a historic gas station in zone "A" and high density [>1/acre] septic systems in zone "A" (2 year time of travel).

Based on the results of the Source Water Assessment and the initial water quality monitoring for Well 8, it appears the well is may be vulnerable to volatile organic chemical (VOC) contamination or synthetic organic chemical (SOC) contamination.

Jacumba must complete the initial quarterly radiological, VOC and SOC monitoring requirements for Well 8. After the initial monitoring requirements are met and provided no VOC's or SOC's are detected, Jacumba must monitor according to the minimum monitoring requirements contained in the California

Code of Regulations, Title 22, Sections 64431-64463.2, and summarized in **Attachment No. 6.**
The monitoring schedule contains the minimum monitoring requirements. Any detected chemical that was not previously detected is required to be verified and more closely monitored with additional sampling requirements. Any VOC or SOC that is confirmed detected must be monitored on an increased frequency of at least once per quarter.

2.4 TREATMENT

Well 4 is chlorinated at the wellhead discharge at a dose of approximately 2.0 mg/L with 12.5% sodium hypochlorite before entering the reservoir and going out to distribution. Water from standby source Well 8 does not have disinfection injection but can be emergency chlorinated if needed. Well 8 has no other treatment and must use Well 8 only as a standby source until manganese treatment is provided for the well. A standby source is defined as a source that is used no more than 15 days a year and no more than 5 consecutive days per Title 22, CCR Section §64414 (c).

2.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The California Department of Public Health (CDPH) as the responsible agency pursuant to California Environmental Quality Act (CEQA) has reviewed the Worksheet for CEQA Exemptions prepared by Jacumba Community Service District (Jacumba) on August 21, 2012. The proposed project is for the replacement of Well No. 6, due to poor water quality, with Well No. 8; the pumping capacity of Well No. 8 is the same (200 gpm) as Well No. 6.

Jacumba has determined that this project is categorically exempt from the California Environmental Quality Act under Class 1 exemption pursuant to CCR, Title 14, Section 15301 and Title 22, Section 60101(a). Jacumba filed a Notice of Exemption (NOE) through the County Clerk's office on September 3, 2003. The CDPH, Environmental Review Unit (ERU) concurs that the project is exempt from CEQA. The ERU will file a NOE through the Governor's Office of Planning and Research, State Clearinghouse upon issuance of the amended water supply permit. The California Department of Fish and Game filing fees do not apply to exempted projects.

As a responsible agency, CDPH has considered the Worksheet for CEQA Exemptions and project description and hereby makes the following findings for the permit amendment:

The Replacement Well No. 8 Project is exempt from CEQA under CCR, Title 14

☒ Class 2 (CCR, Title 14, Sec 15302 and Title 22, Section 60101 (b))

There are no recommended permit conditions.

III APPRAISAL OF SANITARY HAZARDS AND PUBLIC HEALTH SAFEGUARDS

Well 6 does not supply safe, wholesome, and potable water to Jacumba's customers due to the high water temperature (94 °F), high pH of 9.48, fluoride over the MCL, and strong smell of hydrogen sulfide. Therefore, Jacumba inactivated and disconnected this well from the system. Jacumba would need to provide plans for treatment if Well 6 is to be connected to the system and considered an active source in the future. This left Jacumba with only one approved active well source, Well 4.

In order to provide a reliable amount of water to customers and ensure Jacumba has a minimum of two approved well sources, CDPH has approved Well 8 as a standby source for emergency purposes. Well 8 does not meet the water quality standards for manganese. Well 8 must be treated for manganese before it can be permitted as a permanent active source.

There is wellhead disinfection at Well 4 but no disinfection at Well 8. This configuration does not allow Well 8 to be disinfected when Well 4 is not in use; therefore, continuous reliable disinfection at the wellhead of Well 8 must be installed.

Jacumba must complete the initial source water quality monitoring requirements for Well 8 and submit all laboratory reports by electronic data transfer (EDT) to CDPH for review, using the Primary Station Codes (PS_Code: 3710011-009).

IV CONCLUSIONS AND RECOMMENDATIONS

CDPH finds that Jacumba, when operating the sources described in this report, is capable of providing a safe, wholesome and potable water supply. Issuance of an amended domestic water supply permit by CDPH to Jacumba to add Well 8 as a standby source and inactivate Well 6 is recommended subject to the following provisions:

1. Jacumba shall comply with all the requirements set forth in the California Safe Drinking Water Act, California Health and Safety Code and any regulations, standards or orders adopted thereunder.
2. The only approved sources for Jacumba are listed below:

Table 1 – Approved Sources

Source	Status	Capacity	PS Code
Well 4	Active Raw	200 gpm	3710011-004
Well 8	Standby	200 gpm	3710011-009

3. The only approved treatment is disinfection by 12.5% sodium hypochlorite solution.
4. No changes, additions, or modifications shall be made to the sources or treatment mentioned in Provision Nos. 2 and 3 unless an amended water supply permit has first been obtained from CDPH.
5. All water supplied by Jacumba for domestic purposes shall meet all Maximum Contaminant Levels (MCLs) established by CDPH. If the water quality does not comply with drinking water standards, additional treatment shall be provided.
6. Pursuant to Section 64590, Title 22, of the California Code of Regulations (CCR), no chemical or product shall be added to drinking water by a water supplier unless the chemical or product is certified as meeting the specifications of NSF International/ American National Standard Institute (NSF/ANSI) 60(Drinking Water Treatment Chemicals-Health Effects).
7. Pursuant to Section 64591, Title 22, of the CCR, a water system shall not use any chemical, material, lubricant, or product that may come into contact with the drinking water that has not been tested and certified as meeting the specifications of NSF/ANSI 61.
8. All persons responsible for the operation and maintenance of the water system shall be certified in accordance with Sections 63750.1 through 64413.7, inclusive, Title 22, of the CCR. In accordance with these requirements, Jacumba shall employ operator(s) that hold the minimum distribution certification issued by the State of California, listed in the following table:

Table 2 – System Classification

Water System Name	Distribution System Classification	Chief Distribution Operator Minimum Certification	Shift Distribution Operator Minimum Certification
Jacumba Community Services District	D1	D1	D1

WELL 8 TREATMENT REQUIREMENTS

9. The standby status of Well 8 shall not be changed to an active source of drinking water supply, unless treatment is provided to meet all existing drinking water standards and prior approval is obtained from CDPH. Specifically, Well 8 shall have continuous reliable disinfection installed and manganese removal treatment shall be provided.

10. Jacumba shall submit a permit amendment application including plans and specifications for the addition of iron and manganese removal treatment to CDPH within twelve (12) months of issuance of this permit amendment.

WELL 8 OPERATIONAL REQUIREMENTS

11. Jacumba shall submit an Operations Plan for Well 8 including provisions 12-15 as stated below a start-up plan that addresses flushing to waste to ensure that slugs of high iron and manganese do not enter the distribution system, and bacteriological and chemical monitoring and reporting requirements.

12. Well 8 shall not be used more than 15 days a year or more than 5 consecutive days per the limitations of use in conformance with Title 22, CCR Section §64414 (c).

13. Public notification shall be provided to customers served by Well 8 prior to use of the well when the use is planned or within 24 hours of placing the well into service for an unplanned emergency. The notification shall include the following at a minimum:

    a. Explanation of water quality and aesthetic effects of iron and manganese,

    b. Reason for use of the well

    c. Anticipated duration of use of the well

    d. Most recent iron and manganese results from the well

14. Within 3 days after the short-term emergency use of a Well 8, Jacumba shall notify CDPH. The notification shall include information for the reason and duration of use along with proof of public notification required under Provision #13 above.

15. Jacumba shall flush a minimum of two casing volumes prior to placing Well 8 into service. Jacumba shall collect a raw source water bacteriological sample prior to placing the well into service for planned use or upon placing the well into service in an emergency. After 24 hours of operation, Jacumba shall sample for iron and manganese from Well 8.

WELL 6 INACTIVATION

16. Well 6 is no longer approved as a source of supply for Jacumba, and shall remain physically disconnected from the potable water distribution system.

17. Jacumba shall ensure that Well 6 is maintained in a condition that prevents surface water runoff or any other contamination from entering into the well.

18. Jacumba shall destroy Well 6 using methods in conformance with the Department of Water Resources California Well Standards within twelve (12) months of issuance of this permit.

19. If Jacumba chooses to reactivate Well 6, treatment must be installed and Jacumba shall submit a permit application to CDPH for approval prior to use.

20. Well 6 is hereby waived from the water quality monitoring requirements pursuant to Title 22, Division 4, Chapter 15.

GROUNDWATER BACTERIOLOGICAL MONITORING

20. Jacumba shall monitor the raw source water bacteriological quality, prior to chlorination, on a monthly basis for all groundwater wells operating during the month.

21. All raw source water coliform samples collected at the groundwater wells shall be analyzed using an enumeration method and designated as "special" samples and will not be counted for compliance with the routine distribution system coliform monitoring requirements.

22. All total coliform-positive raw water quality samples shall be analyzed for fecal coliform or E. coli bacteria.

23. Jacumba shall notify CDPH within 24-hours if total coliform-positive or E. coli-positive samples have been obtained from a groundwater well and provide CDPH all follow-up sampling results.

24. Jacumba shall take a coliform sample from any active wells within 24 hours of receiving a distribution system coliform positive in accordance with the Ground Water Rule.

25. Jacumba shall submit an updated Bacteriological Sample Siting and Ground Water Rule Plan to CDPH by May 31, 2013.

26. Groundwater wells that produce raw water containing coliform bacteria shall be removed from service following the collection of a confirmation raw water sample from the well. The raw water sample shall be analyzed for coliform and heterotrophic bacteria. If removal of the well from service may result in a water outage or failure of a drinking water standard,

Jacumba shall contact CDPH to discuss interim requirements for the use of this source.

27. Wells that have the confirmation raw water sample from Provision #24 above that is coliform positive shall be removed from service, disinfected, pumped to waste until zero chlorine residual is obtained, and re-sampled after 24 hours for coliform and heterotrophic bacteria using the cycle test procedure. All re-samples shall be negative for coliform and have a heterotrophic plate count (HPC) less than 500 colonies/mL prior to placing the source back into service. If removal of the well from service may result in a water outage or failure of a drinking water standard, Jacumba shall contact CDPH to discuss interim requirements for the use of this source.

28. Jacumba shall comply with the Ground Water Rule (GWR). For each Total Coliform Rule (TCR) distribution system monitoring sample result that is coliform positive, Jacumba shall collect a sample from each active well and analyze for E. coli within 24-hours of learning of the TCR coliform positive. Jacumba shall collect at least one sample from each active well in use at the time the TCR total coliform positive monitoring sample was collected. Jacumba shall conduct Tier 1 Public Notification if a well monitoring sample is E. coli positive.

29. Groundwater wells removed from service for repair and/or maintenance activities shall be disinfected and the raw water tested for coliform and heterotrophic bacteria prior to placing the wells back into service. Groundwater wells shall not be placed back into service to supply the potable water system unless the laboratory results show that the wells are coliform absent.

GROUNDWATER WELL CHEMICAL MONITORING

30. Jacumba shall complete the required source water monitoring Sections 64431-64450, Title 22, CCR. All analyses required for compliance shall be performed by a State-certified laboratory and shall be submitted via Electronic Data Transfer (EDT). The monitoring matrix is included in **Attachment 6** of the Engineering Report.

31. Jacumba shall conduct all inorganic, organic, and radiological monitoring once every compliance cycle, 9 years, unless a waiver has been granted by CDPH pursuant to Sections 64432 (k) or (l) for inorganics, or Sections 64445 (d) for organics.

32. Jacumba shall complete initial Perchlorate monitoring before use of Well 8 as a standby source.

RECORDS AND REPORTING

33. Jacumba shall record the water production output and static and pumping groundwater levels for each well source on a monthly basis at a minimum. Written water production and groundwater depth records shall be

maintained by Jacumba for a minimum of ten years and be available to CDPH representatives upon request.

34. Monthly laboratory reports of distribution (for TCR compliance) and raw water bacteriological analysis from each well source operated by Jacumba shall be mailed to CDPH directly by the laboratory by the tenth day of the following month.

35. Jacumba shall have the lab submit chemical water quality data to CDPH using Electronic Data Format (EDF) using the Primary Station Codes listed in Provision #2 of this permit. The PS Code for Well 8 is 3710011-009.

V APPENDICES

Attachment	No.
Permit Amendment Application	1
Well Site Map	2
Well Datasheet	3
Well Disinfection Datasheet	4
Summary of Initial Source Water Quality Results	5
Vulnerability Assessment and Monitoring Schedule – Groundwater	6
CEQA Documents	7

Attachment No. 1

Permit Amendment Application

STATE OF CALIFORNIA
APPLICATION
FOR
DOMESTIC WATER SUPPLY PERMIT AMENDMENT
FROM

Applicant: JACUMBA COMMUNITY SERVICE DISTRICT
(Enter the name of legal owner, person(s) or organization)

Address: 1266 RAILROAD ST JACUMBA CA 91934

System Name: JACUMBA COMMUNITY SERVICE DISTRICT

System Number: 3710011

TO: Department of Public Health
Southern California
Drinking Water Field Operations Branch
Riverside District Office
1350 Front Street, Room 2050
San Diego, California, 92101

Pursuant and subject to the requirements of the California Health and Safety Code, Division 104, Part 12, Chapter 4 (California Safe Drinking Water Act), Article 7, Section 116550, relating to changes requiring an amended permit, application is hereby made to amend an existing water supply permit to INACTIVATE Well #6 AS THE STANDBY SOURCE AND ACTIVATE WELL #8 AS NEW EMERGENCY STANDBY SOURCE ON A TEMPORARY BASIS UNTIL THE MANGANESE TREATMENT SYSTEM FOR WELL #8 IS INSTALLED ALONG WITH COMPLETION OF WELL #7 IMPROVEMENT AT WHICH TIME WELL #8 WILL BECOME THE PRIMARY WELL WATER SOURCE WITH WELL #7 AS THE PRIMARY EMERGENCY STANDBY SOURCE WITH WELL #4 AS THE SECONDARY EMERGENCY STANDBY SOURCE.

I (We) declare under penalty of perjury that the statements on this application and on the accompanying attachments are correct to my (our) knowledge and that I (we) are acting under authority and direction of the responsible legal entity under whose name this application is made.

By: TOM LINDENMEYER

Title: GENERAL MANAGER

Address: 1266 RAILROAD ST/ P.O. BOX 425
JACUMBA, CA 91934

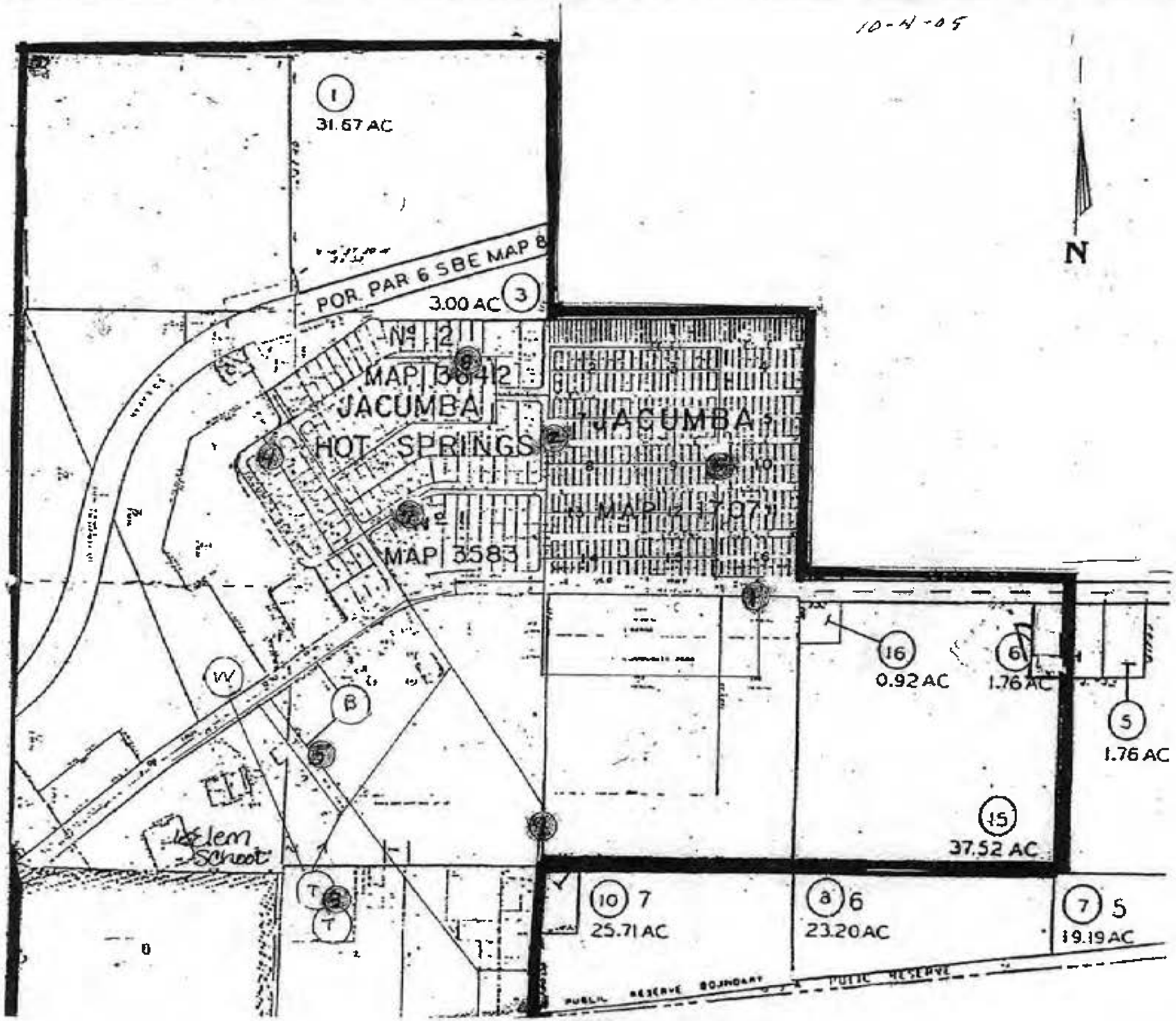
Telephone: 619-766-4359

Dated: 3-14-2012

DDW 05/2001

Attachment No. 2

Well Site Map


10-N-05
1
31.67 AC
POR. PAR 6 SBE MAP 8
3.00 AC
3
MAP 3642
JACUMBA
HOT SPRINGS
JACUMBA
MAP 1797
MAP 3583
N
16
0.92 AC
6
1.76 AC
5
1.76 AC
15
37.52 AC
10 7
25.71 AC
8 6
23.20 AC
7 5
19.19 AC
W
B
T
T
PUBLIC RESERVE BOUNDARY
PUBLIC RESERVE

Attachment No. 3

Well Data Sheet

WELL DATA SHEET (Page 1 of 2)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
DATA SHEET GENERAL INFORMATION		
System Name	JACUMBA CSD	from DHS database
System Number	3710011	from DHS database
Source of Information *(well log, DHS/County files, system, etc)*	JACUMBA CSD	
Organization Collecting Information *(DHS, County, System, other)*	DHS	
Date Information Collected/Updated	2/2/2012	
WELL IDENTIFICATION		
* Well Number or Name	8	from DHS database
* DHS Source Identification Number (FRDS ID No.)	3710011-08	
DWR Well Log on File? ("YES" or "NO")		
State Well Number (from DWR)		
Well Status (Active, Standby, Inactive)	STANDBY	from DHS database
WELL LOCATION		
Latitude		from DHS database
Longitude		from DHS database
Ground Surface Elevation (ft above Mean Sea Level)	3841 FT	
Street Address	44300 OLD HWY 80	
Nearest Cross Street	JACUMBA ST	
City	JACUMBA	
County	SAN DIEGO	
* Neighborhood/Surrounding Area *(see Note 1)*	RURAL RESIDENTIAL	
Site plan on file? ("YES" or "NO")		
DWR Ground Water Basin		to come from DWR
DWR Ground Water Sub-basin		to come from DWR
SANITARY CONDITIONS		
** Distance to closest Sewer Line, Sewage Disposal, Septic Tank (ft)	190 FT	
Distance to Active Wells (ft)	310 FT	
Distance to Abandoned Wells (ft)	1500 FT	
Distance to Surface Water (ft)	3500 FT	
** Size of controlled area around well (square feet)	3882 SQ FT	
* Type of access control to well site *(fencing, building, etc)*	FENCING	
* Surface Seal? (Concrete slab)("YES", "NO" or "UNKNOWN")	YES	
* Dimensions of concrete slab: Length(ft)/ Width(ft)/ Thick(in)	6FTX6FTX8IN	
* Within 100 year flood plain? ("YES", "NO" or "UNKNOWN")	NO	
* Drainage away from well? ("YES" or "NO")	YES	
ENCLOSURE/HOUSING		
Enclosure Type *(building, vault, none, etc.)*	BUILDING	
Floor material	CONCRETE	
Located in Pit? ("YES" or "NO")	NO	
Pit depth (feet) (if applicable)	N/A	
WELL CONSTRUCTION		
Date drilled	12/28/2005	
Drilling Method	AIR ROTARY	
Depth of Bore Hole (feet below ground surface)	524 FT	
Casing Beginning Depth/Ending Depth(ft below surface); 2nd Casing Beginning Depth/Ending Depth; 3rd Casing, etc.	0 FT - 55FT; 55FT - 333FT; 0 FT - 153FT; 153FT - 518FT	
Casing Diameter (inches); 2nd Casing Diameter; 3rd Casing, etc.	18 IN; 12 IN; 8 IN	
Casing Material; 2nd Casing Material; 3rd Casing, etc.	STEEL; PVC; PVC	

WELL DATA SHEET (Page 2 of 2)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
WELL CONSTRUCTION (continued)		
Conductor casing used? ("YES", "NO" or "UNKNOWN") *(See Note 2)*	NO	
Conductor casing removed? ("YES", "NO" or "UNKNOWN")	N/A	
* Depth to highest perforations/screens (ft below surface) (or "UNKNOWN")	153 FT	
Screened Interval Beginning Depth/Ending Depth (ft below surface); 2nd Screened Interval Beg. Depth/Ending Depth; 3rd Screened Interval, etc.	153 FT-513 FT	
* Total length of screened interval (ft) *(default = 10% pump capacity in gpm)* (or "UNKNOWN")	360 FT	
* Annular Seal?("YES", "NO" or "UNKNOWN") *(See Note 3)*	YES	
* Depth of Annular Seal (ft)	150 FT	
Material of Annular Seal *(cement grout, bentonite, etc.)*	CEMENT	
Gravel pack, Depth to top (ft below ground surface)	163 FT	
Total length of gravel pack (ft)	371 FT	
AQUIFER		
* Aquifer Materials *(list all that apply: sand, silt, clay, gravel, rock, fractured rock)*	SAND GRANITE;GRANODIORITE	
* Effective porosity (decimal percent) *(default = 0.2)* (or "UNKNOWN")	UNKNOWN	
* Confining layer (Impervious Strata) above aquifer? ("YES", "NO" or "UNKNOWN")	UNKNOWN	
Thickness of confining layer, if known (ft)	UNKNOWN	
Depth to confining layer, if known (ft below ground)	UNKNOWN	
* Static water level (ft below ground surface)	24 FT	
Static water level measurement: Date/Method	2/1/2000	
Pumping water level (ft below ground surface)	241 FT AFTER 72 HRS	
Pumping water level measurement: Date/Method	3-2-2000 DATALOGER	
WELL PRODUCTION		
Well Yield (gpm)	200 GPM	
Well Yield Based On (i.e., pump test, etc.)	PUMP TEST	
Date measured	3/2/2000	
Is the well metered? ("YES" or "NO")	YES	
Production (gallons per year)	TBD	
Frequency of Use (hours/year)	TBD	
Typical pumping duration (hours/day)	TBD	
PUMP		
Make	FRANKLIN GOULD PMP	
Type	6 IN SUBMERSABLE	
Size (hp)	30 ~~300~~ HP	
* Capacity (gpm)	200 GPM	
Depth to suction intake (ft below ground surface)	440 FT	
Lubrication Type	SCALED	
Type of Power: *(i.e., electric, diesel, etc.)*	ELECTRIC	
Auxiliary power available? ("YES" or "NO")	YES	
Operation controlled by: *(i.e., level in tank, pressure, etc.)*	LEVEL, MANUAL	
Pump to Waste capability? ("YES" or "NO")	YES	
Discharges to: *(i.e., distribution system, storage, etc.)*	STORAGE TANKS	
REMARKS AND DEFECTS (use additional sheets as necessary)		

NOTES

1. Neighborhood/Surrounding Area (list all that apply): Ag = Agricultural, Ru = Rural, Re = Residential, Co = Commercial, I = Industrial, Mu = Municipal, P = Pristine, O = Other
2. Conductor Casing - Oversized casing used to stabilize bore hole during well construction. Should be removed during installation of annular
3. Annular Seal - Seal of grout in the space between the well casing and the wall of the drilled hole. Sometimes called "sanitary seal".

Attachment No. 4

Well Disinfection Data Sheet

State of California
Department of Health Services

Drinking Water Field Operations Branch
Riverside District

DISINFECTION DATA

System Name:	Jacumba Community Services	System No.:	3710011
Source of Information:	Tom Lindenmeyer	Date:	
Collected By:		Prepared By:	

Well 04 Disinfection

Site Name/Location	3710011-009 3710011-004 JACUMBA CA
Type of Disinfectant Used	
Application	
Water Treated (raw, filtered, etc.)	SODIUM HYPOCHLORITE - RAW
Oxidant Demand Character	
Point of Application	PUMP HOUSE
Mixing	NONE
Contact Time (minutes, method of determination)	9768 EPA CONTACT TIME CALC.
Minimum Contact Time Before Residual Test	4333
How is Chlorine Contact Time Determined	EPA CALCULATOR
Water Flow Variation	
Average Daily Flow (gpm)	66GPM
Maximum Daily Flow (gpm)	100 GPM
Peak Hourly Flow (gpm)	200 GPM
Equipment Specifications	
Make	PULSATRON
Type	DIAPHRAGM METERING PUMP
Capacity	12 GALLONS PER DAY
Condition	NEW
Enclosure	
Type	BUILDING BLOCK
Insulation	YES
Heating	ELECTRIC
Chemical Added	
Type	SODIUM HYPOCHLORITE
% Available Disinfectant Form	13%
Cylinder or Crock Capacity	50 GALLONS
Supplier Re-stocking time	ABCANA
Stock On Hand	15 - 60 GALLONS
Safety Features (Locks, Leak Detection, Vents, Alarms, etc.)	VENTS
Operation and Maintenance	
Spare Parts on Hand	YES
Ability to Make Repairs	YES
Equipment Inspection Frequency	DAILY
Residual Testing	
Type (Free, Combined, Other)	FREE
Test Made (DPD, etc.)	DPD
Type of Instrument	HACH
Continuous or Grab Sampling?	GRAB
Residual Testing Location	STORAGE TANKS
Records	DAILY
Frequency of Equipment Calibration	
Reliability Features	
Auxiliary Power	YES
Automatic Switchover (Y/N)	NO
Condition of Scales	N/A
Alarms	N/A
Defects and Remarks:	

Attachment No. 5

Initial Water Quality Results

WATER SAMPLE TESTS

WELL	IRON	MANGANESE	Ph	DISSOLVED SOLIDS	BARIUM	FLUORIDE
#7	124 ug/L	27.0 ug/L	7.60	651 mg/L	ND	0.43 mg/L
→ #8	27 ug/L	196.0 ug/L	7.62	715 mg/L	36.0 ug/L	0.39 mg/L

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Environmental Engineering Laboratory, Inc.
3538 Hancock St, San Diego CA 92110 | P: (619) 298-6131 | F: (619) 298-6141

TEST REPORT

Recipient:	Tom Lindenmeyer	**Report Date:**	03/10/2009
	JACUMBA COMM.SERVICE DIST.	**Matrix:**	WATER
	P.O. BOX 425	**Sampled:**	02/27/2009 8:30
	JACUMBA, CA 91934	**Received:**	02/27/2009 10:45
Reference:	0939970	**Collection Address:**	Jacumba, Ca
Lab ID:	0939970-002	**Sample Location:**	Well #8
Sample #:		**Description:**	
Project#:		**Date Started:**	02/27/2009
Comment:		**Date Completed:**	03/10/2009
		PS Code:	WAT

General Mineral

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Alkalinity - Bicarbonate	159	mg/L	1.0	-	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Carbonate	ND	mg/L	1.0	-	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Hydroxide	ND	mg/L	1.0	-	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Total	130	mg/L	1.0	-	1	SM2320B	03/01/2009 14:50	MEH
Calcium	113	mg/L	0.1	-	1	EPA200.7	03/04/2009 10:45	AQU
Chloride	165	mg/L	0.2	600	1	EPA 300.0	03/01/2009 11:15	MEH
Conductance, Specific	1,157	uMHO/cm	1	2200	1	SM2510B	02/27/2009 13:27	KT
Copper	ND	ug/L	5	1000	1	EPA200.8	03/04/2009 10:45	AQU
Hardness	366	mg/L	2.0	-	1	SM 3120B	03/10/2009 13:19	MEH
→ Iron	27.0	ug/L	20	300	1	EPA200.7	03/04/2009 10:45	AQU
Magnesium	20.4	mg/L	0.1	-	1	EPA200.7	03/04/2009 10:45	AQU
→ Manganese	196	ug/L	10	50	1	EPA200.7	03/04/2009 10:45	AQU
pH	7.62	none	0.01	0	1	EPA150.	02/27/2009 10:50	MEH
Sodium	68.0	mg/L	1	-	1	EPA200.7	03/04/2009 10:45	AQU
→ Solids, Dissolved	715	mg/L	10	-	1	SM2450C	02/27/2009 13:43	KT
Sulfate	253	mg/L	0.5	600	1	EPA 300.0	03/01/2009 11:15	MEH
Sulfonated Detergent - MBAS	ND	mg/L	0.05	0.5	1	SM 5540C	03/01/2009 17:15	MEH
Zinc	36.0	ug/L	20	5000	1	EPA200.8	03/04/2009 10:45	AQU

Inorganic Chemical

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Aluminum	ND	ug/L	30	1000	1	EPA200.8	03/05/2009 10:45	AQU
Arsenic	ND	ug/L	2	50	1	EPA200.8	03/05/2009 10:45	AQU
→ Barium	36.0	ug/L	2	1000	1	EPA200.8	03/05/2009 10:45	AQU
Cadmium	ND	ug/L	1	5	1	EPA200.8	03/05/2009 10:45	AQU
Chromium, Total	ND	ug/L	1	50	1	EPA200.8	03/05/2009 10:45	AQU
Copper	ND	ug/L	5	1000	1	EPA200.8	03/05/2009 10:45	AQU
Fluoride	0.39	mg/L	0.1	2.0	1	EPA 300.0	03/01/2009 11:15	MEH
Lead	ND	ug/L	4	15	1	EPA200.8	03/05/2009 10:45	AQU
Mercury	ND	ug/L	0.2	2	1	EPA200.8	03/05/2009 10:45	AQU
Nitrogen, Nitrate (as NO3)	ND	mg/L	2.0	45	1	EPA 300.0	03/01/2009 11:15	MEH
Selenium	ND	ug/L	5	50	1	EPA200.8	03/05/2009 10:45	AQU
Silver	ND	ug/L	5	100	1	EPA200.8	03/05/2009 10:45	AQU

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

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TEST REPORT

Recipient:	Tom Lindenmeyer JACUMBA COMM.SERVICE DIST. P.O. BOX 425 JACUMBA, CA 91934	Report Date:	03/30/2009
		Matrix:	WATER
		Sampled:	02/27/2009 8:30
		Received:	02/27/2009 10:45
		Collection Address:	Jacumba, Ca
Reference:	0939970	Sample Location:	Well #8
Lab ID:	0939970-002	Description:	
Sample #:		Date Started:	02/27/2009
Project#:		Date Completed:	03/30/2009
Comment:		PS Code:	WAT

Carbamates By 531.1

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
3-Hydroxycarbofuran	ND	µg/L	3	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
Aldicarb	ND	µg/L	3	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
Aldicarb Sulfoxide	ND	µg/L	3	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
Aldicarb Sulfone	ND	µg/L	2	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
BDMC	100	%	N/A	N/A	1	EPA 531.1	03/06/2009 17:40	BSK
Carbaryl	ND	µg/L	5	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
Carbofuran	ND	µg/L	5	18	1	EPA 531.1	03/18/2009 18:10	BSK
Methomyl	ND	µg/L	2	N/A	1	EPA 531.1	03/18/2009 18:10	BSK
Oxamyl	ND	µg/L	20	50	1	EPA 531.1	03/18/2009 18:10	BSK

General Mineral

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Alkalinity - Bicarbonate	159	mg/L	1.0	N/A	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Carbonate	ND	mg/L	1.0	N/A	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Hydroxide	ND	mg/L	1.0	N/A	1	SM2320B	03/01/2009 14:50	MEH
Alkalinity - Total	130	mg/L	1.0	N/A	1	SM2320B	03/01/2009 14:50	MEH
Calcium	113	mg/L	0.1	N/A	1	EPA200.7	03/04/2009 10:45	AQU
Chloride	165	mg/L	0.2	600	1	EPA 300.0	03/01/2009 11:15	MEH
Conductance, Specific	1,157	uMHO/cm	1	2200	1	SM2510B	02/27/2009 13:27	KT
Copper	ND	ug/L	5	1000	1	EPA200.8	03/04/2009 10:45	AQU
Hardness	366	mg/L	2.0	N/A	1	SM 3120B	03/10/2009 13:19	MEH
Iron	27.0	ug/L	20	300	1	EPA200.7	03/04/2009 10:45	AQU
Magnesium	20.4	mg/L	0.1	N/A	1	EPA200.7	03/04/2009 10:45	AQU
Manganese	196	ug/L	10	50	1	EPA200.7	03/04/2009 10:45	AQU
pH	7.62	none	0.01	0	1	SM 4500 H	02/27/2009 10:50	MEH
Sodium	68.0	mg/L	1	N/A	1	EPA200.7	03/04/2009 10:45	AQU
Solids, Dissolved	715	mg/L	10	N/A	1	SM2450C	02/27/2009 13:43	KT
Sulfate	253	mg/L	0.5	600	1	EPA 300.0	03/01/2009 11:15	MEH
Surfactant Detergent - MBAS	ND	mg/L	0.05	0.5	1	SM 5540C	03/01/2009 17:15	MEH
Zinc	36.0	ug/L	20	5000	1	EPA200.8	03/04/2009 10:45	AQU

General Physical

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Color, Visual	<3	UNITS	3	15	1	SM 2120B	02/27/2009 12:10	KT
Odor	ND	TON	1	N/A	1	SM 2150	02/27/2009 12:10	KT
Turbidity	0.89	NTU	0.10	1.0	1	SM2130B	02/27/2009 12:10	KT

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TEST REPORT

Recipient: Tom Lindenmeyer
JACUMBA COMM.SERVICE DIST.
P.O. BOX 425
JACUMBA, CA 91934
Reference: 0939970
Lab ID: 0939970-002
Sample #:
Project#:
Comment:

Report Date: 03/30/2009
Matrix: WATER
Sampled: 02/27/2009 8:30
Received: 02/27/2009 20:45
Collection Address: Jacumba, Ca
Sample Location: Well #8
Description:
Date Started: 02/27/2009
Date Completed: 03/30/2009
PS Code: WAT

Gross Alpha and Beta

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Gross Alpha Counting Error	1.32	pCi/L	N/A	N/A	1	SM 7110B	03/05/2009 12:18	MEH
Gross Beta Counting Error	1.09	pCi/L	N/A	N/A	1	SM 7110B	03/05/2009 12:18	MEH
Radioactivity, Gross Alpha	3.55	pCi/L	3	15	1	SM 7110B	03/05/2009 12:18	MEH
Radioactivity, Gross Beta	10.4	pCi/L	4	N/A	1	M 7110B/EPA9(	03/05/2009 12:18	MEH

Herbicides by EPA 515.1

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
2,4-D (Dichlorophenoxy) Acetic Acid	ND	µg/L	10	70	1	EPA 515.1	03/18/2009 18:03	BSK
2,4,5-T	ND	µg/L	1	N/A	1	EPA 515.1	03/18/2009 18:03	BSK
Bentazon	ND	µg/L	2	18	1	EPA 515.1	03/18/2009 18:03	BSK
Dalapon	ND	µg/L	10	200	1	EPA 515.1	03/18/2009 18:03	BSK
Dicamba	ND	µg/L	1.5	N/A	1	EPA 515.1	03/18/2009 18:03	BSK
Dinoseb	ND	µg/L	2	7	1	EPA 515.1	03/18/2009 18:03	BSK
Pentachlorophenol	ND	µg/L	0.2	1	1	EPA 515.1	03/18/2009 18:03	BSK
Picloram	ND	µg/L	1	500	1	EPA 515.1	03/18/2009 18:03	BSK
Silvex	ND	µg/L	1	50	1	EPA 515.1	03/18/2009 18:03	BSK

Inorganic Chemical

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Aluminum	ND	ug/L	30	1000	1	EPA200.8	03/05/2009 10:45	AQU
Arsenic	ND	ug/L	2	50	1	EPA200.8	03/05/2009 10:45	AQU
Barium	36.0	ug/L	2	1000	1	EPA200.8	03/05/2009 10:45	AQU
Cadmium	ND	ug/L	1	5	1	EPA200.8	03/05/2009 10:45	AQU
Chromium, Total	ND	ug/L	1	50	1	EPA200.8	03/05/2009 10:45	AQU
Copper	ND	ug/L	5	1000	1	EPA200.8	03/05/2009 10:45	AQU
Fluoride	0.39	mg/L	0.1	2.0	1	EPA 300.0	03/01/2009 11:15	MEH
Lead	ND	ug/L	4	15	1	EPA200.8	03/05/2009 10:45	AQU
Mercury	ND	ug/L	0.2	2	1	EPA200.8	03/05/2009 10:45	AQU
Nitrogen, Nitrate (as NO3)	ND	mg/L	2.0	45	1	EPA 300.0	03/01/2009 11:15	MEH
Selenium	ND	ug/L	5	50	1	EPA200.8	03/05/2009 10:45	AQU
Silver	ND	ug/L	5	100	1	EPA200.8	03/05/2009 10:45	AQU

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

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TEST REPORT

Recipient:	Tom Lindenmeyer	Report Date:	03/30/2009	
	JACUMBA COMM SERVICE DIST.	Matrix:	WATER	
	P.O. BOX 425	Sampled:	02/27/2009	8:30
	JACUMBA, CA 91934	Received:	02/27/2009	10:45
Reference:	0939970	Collection Address:	Jacumba, Ca	
Lab ID:	0939970-002	Sample Location:	Well #8	
Sample #:		Description:		
Project#:		Date Started:	02/27/2009	
Comment:		Date Completed:	03/30/2009	
		PS Code:	WAT	

Pesticides and PCBs by EPA 505

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Aldrin	ND	µg/L	0.075	N/A	1	EPA 505	03/06/2009 17:40	BSK
Chlordane	ND	µg/L	0.1	0.1	1	EPA 505	03/06/2009 17:40	BSK
Chlorothalonil (Daconil, Bravo)	ND	µg/L	5.0	N/A	1	EPA 505	03/06/2009 17:40	BSK
Dieldrin	ND	µg/L	0.02	N/A	1	EPA 505	03/06/2009 17:40	BSK
Endrin	ND	µg/L	0.1	2	1	EPA 505	03/06/2009 17:40	BSK
Heptachlor	ND	µg/L	0.01	0.01	1	EPA 505	03/06/2009 17:40	BSK
Heptachlor epoxide	ND	µg/L	0.01	0.01	1	EPA 505	03/06/2009 17:40	BSK
Hexachlorobenzene	ND	µg/L	0	1	1	EPA 505	03/06/2009 17:40	BSK
Hexachlorocyclopentadiene	ND	µg/L	1	50	1	EPA 505	03/06/2009 17:40	BSK
Lindane (BHC gamma isomer)	ND	µg/L	0.2	0.2	1	EPA 505	03/06/2009 17:40	BSK
Methoxychlor	ND	µg/L	10	30	1	EPA 505	03/06/2009 17:40	BSK
PCBs: Aroichlor Screen	ND	µg/L	0.2	0.5	1	EPA 505	03/06/2009 17:40	BSK
Toxaphene	ND	µg/L	1	3	1	EPA 505	03/06/2009 17:40	BSK
Trifluralin	ND	µg/L	1	N/A	1	EPA 505	03/06/2009 17:40	BSK

Radium (226)

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Radium 226 Counting Error	0.695	pCi/L	N/A	N/A	1	EPA 903.0	03/17/2009 15:01	PAS
→ Total Alpha Radium (226)	1.07	pCi/L	1.0	5	1	EPA 903.0	03/17/2009 15:01	PAS

Radium (228)

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
→ Radium 228	0.906	pCi/L	1.0	2.0	1	EPA Ra5	03/26/2009 15:01	PAS
Radium 228 Counting Error	0.361	pCi/L	N/A	N/A	1	EPA Ra5	03/26/2009 15:01	PAS

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

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TEST REPORT

Recipient:	Tom Lindemeyer	Report Date:	03/30/2009
	JACUMBA COMM.SERVICE DIST.	Matrix:	WATER
	P.O. BOX 425	Sampled:	02/27/2009 8:30
	JACUMBA, CA 91934	Received:	02/27/2009 10:45
Reference:	0939970	Collection Address:	Jacumba, Ca
Lab ID:	0939970-002	Sample Location:	Well #8
Sample #:		Description:	
Project#:		Date Started:	02/27/2009
Comment:		Date Completed:	03/30/2009
		PS Code:	WAT

SVOCs By EPA 525.2 (Full List)

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Alachlor	ND	µg/L	1	2	1	EPA 525.2	03/11/2009 12:44	AQU
Atrazine	ND	µg/L	0.5	1	1	EPA 525.2	03/11/2009 12:44	AQU
Benzo (a) Pyrene	ND	µg/L	0.1	0.2	1	EPA 525.2	03/11/2009 12:44	AQU
Bis(2-ethylhexyl)adipate	ND	µg/L	3	400	1	EPA 525.2	03/11/2009 12:44	AQU
Bis(2-ethylhexyl)phthalate	ND	µg/L	3	4	1	EPA 525.2	03/11/2009 12:44	AQU
Bromacil (Hyvar)	ND	µg/L	10	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Butachlor	ND	µg/L	0.38	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Diazinon	ND	µg/L	0.25	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Dimethoate (Cygon)	ND	µg/L	10	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Metolachlor	ND	µg/L	0.5	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Metribuzin	ND	µg/L	0.5	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Molinate (Ordram)	ND	µg/L	2	20	1	EPA 525.2	03/11/2009 12:44	AQU
Prometryn (Caparol)	ND	µg/L	2	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Propachlor	ND	µg/L	0.5	N/A	1	EPA 525.2	03/11/2009 12:44	AQU
Simazine	ND	µg/L	1	4	1	EPA 525.2	03/11/2009 12:44	AQU
Thiobencarb (Bolero)	ND	µg/L	1	70	1	EPA 525.2	03/11/2009 12:44	AQU

Test Parameters

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Endothall By EPA 548	ND	ug/L	45	100	1	EPA548.1	03/09/2009 17:40	BSK
Glyphosate By EPA 547	ND	ug/L	25	700	1	EPA547	03/10/2009 17:40	BSK
Uranium	ND	pCi/L	2.0	20	1	EPA200.8	03/09/2009 17:40	BSK

Approval: _____ QA/QC Officer

_____ Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

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TEST REPORT

Recipient:	Tom Lindenmeyer	Report Date:	
	JACUMBA COMM.SERVICE DIST.	Matrix:	WATER
	P.O. BOX 425	Sampled:	02/27/2009 8:30
	JACUMBA, CA 91934	Received:	02/27/2009 10:45
Reference:	0939970	Collection Address:	Jacumba, Ca.
Lab ID:	0939970-002	Sample Location:	Well #8
Sample #:		Description:	
Project#:		Date Started:	02/27/2009
Comment:		Date Completed:	03/30/2009
		PS Code:	WAT

Analyzed: 3/10/2009 @ 11:11 Method: EPA 524.2
Analyst: AQU Dilution Factor: 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L
1,1,1,2-Tetrachloroethane	ND	N/A	0.5	Cis-1,2-Dichloroethylene	ND	6	0.5
1,1,1-Trichloroethane	ND	200	0.5	Cis-1,3-Dichloropropene	ND	N/A	0.5
1,1,2,2-Tetrachloroethane	ND	1	0.5	Dibromochloromethane	ND	N/A	0.5
1,1,2-Trichloroethane	ND	5	0.5	Dibromomethane	ND	N/A	0.5
1,1-Dichloroethane	ND	5	0.5	Dichlorodifluoromethane	ND	N/A	0.5
1,1-Dichloroethylene	ND	6	0.5	Dichloromethane(Methylenchlor)	ND	5	0.5
1,1-Dichloropropene	ND	N/A	0.5	Ethylbenzene	ND	300	0.5
1,2 Dichlorobenzene (o-DCB)	ND	600	5	Hexachlorobutadiene	ND	N/A	0.5
1,2,3-Trichlorobenzene	ND	N/A	0.5	Isopropylbenzene (Cumene)	ND	N/A	0.5
1,2,3-Trichloropropane	ND	N/A	0.5	Methyl Tert-butyl Ether (MTBE)	ND	5	1.0
1,2,4-Trichlorobenzene	ND	5	0.5	Monochlorobenzene	ND	70	0.5
1,2,4-Trimethylbenzene	ND	N/A	0.5	Napthalene	ND	N/A	0.5
1,2-Dichloroethane	ND	0.5	0.5	N-butylbenzene	ND	N/A	0.5
1,2-Dichloropropane	ND	5	0.5	N-propylbenzene	ND	N/A	0.5
1,3,5-Trimethylbenzene	ND	N/A	0.5	P-isopropyltoluene	ND	N/A	0.5
1,3-Dichlorobenzene	ND	N/A	0.5	Sec-butylbenzene	ND	100	0.5
1,3-Dichloropropane	ND	N/A	0.5	Styrene	ND	N/A	0.5
1,3-Dichloropropene	ND	0.5	0.5	Tert-butylbenzene	ND	5	0.5
1,4-Dichlorobenzene (p-DCB)	ND	5	0.5	Tetrachloroethylene (PCE)	ND	150	0.5
2,2-Dichloropropane	ND	N/A	0.5	Toluene	0.90	80	0.5
2-Chlorotoluene	ND	N/A	0.5	Total Trihalomethanes	ND	10	0.5
4-Chlorotoluene	ND	N/A	0.5	Trans-1,2-dichloroethylene	ND	N/A	0.5
Benzene	ND	1.0	0.5	Trans-1,3-dichloropropene	ND	5	0.5
Bromobenzene	ND	N/A	0.5	Trichloroethylene (TCE)	ND	150	5.00
Bromochloromethane	ND	N/A	0.5	Trichlorofluoromethane	ND	0.5	0.5
Bromodichloromethane	ND	N/A	0.5	Vinyl Chloride	ND	1750	0.5
Bromoform	ND	N/A	0.5	Xylenes	ND	1750	0.5
Bromomethane	ND	N/A	0.5				
Carbon Tetrachloride	ND	0.5	0.5				
Chloroethane	ND	N/A	0.5				
Chloroform	0.90	N/A	0.5				
Chloromethane	ND	N/A	0.5				

Surrogates	% Recovered	QC Limits (%)	
1,2-Dichlorobenzene-d4	86%	40	140
4-Bromofluorobenzene	84%	40	140

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

Institute for Environmental Health
Environmental Engineering Laboratory, Inc.
3538 Hancock St. San Diego, CA 92110 | P: (619) 296-6131 | F: (619) 296-6141

TEST REPORT

Recipient:	Tom Lindenmeyer	Report Date:		
	JACUMBA COMM.SERVICE DIST.	Matrix:	WATER	
	P.O. BOX 425	Sampled:	02/27/2009	8:30
	JACUMBA, CA 91934	Received:	02/27/2009	10:45
Reference:	0939970	Collection Address:	Jacumba, Ca	
Lab ID:	0939970-002	Sample Location:	Well #8	
Sample #:		Description:		
Project#:		Date Started:	02/27/2009	
Comment:		Date Completed:	03/30/2009	
		PS Code:	WAT	

Analyzed: 3/10/2009 @ 11:11 Method: EPA 524.2
Analyst: AQU Dilution Factor: 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L

Approval: _____
QA/QC Officer

Approval: _____
Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

Attachment No. 6

Monitoring Schedule

Standby		Standby STBY	
CD	Constituent	FRQ	
GP	Aggressiveness Index	108	9 years
GP	Bicarbonate	108	9 years
GP	Calcium	108	9 years
GP	Carbonate	108	9 years
GP	Chloride	108	9 years
GP	Color	108	9 years
GP	Copper	108	9 years
GP	Foaming Agents (MBAS)	108	9 years
GP	Hardness Total as CaCO3	108	9 years
GP	Hydroxide	108	9 years
GP	Iron	108	9 years
GP	Magnesium	108	9 years
GP	Manganese	108	9 years
GP	Odor	108	9 years
GP	pH, laboratory	108	9 years
GP	Silver	108	9 years
GP	Sodium	108	9 years
GP	Specific Conductance	108	9 years
GP	Sulfate	108	9 years
GP	Total Dissolved Solids (TDS)	108	9 years
GP	Turbidity, laboratory	108	9 years
GP	Zinc	108	9 years
IO	Aluminum	108	9 years
IO	Antimony	108	9 years
IO	Arsenic	108	9 years
IO	Asbestos	0,999,999	Waived
IO	Barium	108	9 years
IO	Beryllium	108	9 years
IO	Cadmium	108	9 years
IO	Chromium	108	9 years
IO	Cyanide	108	9 years
IO	Fluoride	108	9 years
IO	Lead	108	9 years
IO	Mercury	108	9 years
IO	Nickel	108	9 years
IO	Perchlorate	108	9 years
IO	Selenium	108	9 years
IO	Thallium	108	9 years
NI	Nitrate as NO3	108	9 years
NI	Nitrite as N	108	9 years
RA	Gross Alpha	108	9 years
RA	Gross Beta	0,999,999	Waived
RA	RA 226 for CWS	0,999,999	Waived
RA	RA 226 or Total Radium	0,999,999	Waived
RA	Radium 226	0,999,999	Waived

S1	Trichloroethylene	108	9 years
S1	Trichlorofluoromethane (Freon 11)	108	9 years
S1	1,1,2-Trichloro-1,2,2-Trifluoroethane (Fre	108	9 years
S1	Vinyl Chloride	108	9 years
S1	Xylenes (Total)	108	9 years
S2	Alachlor	0,999,999	Waived
S2	Atrazine	108	9 years
S2	Bentazon	0,999,999	Waived
S2	Benzo(a)pyrene	0,999,999	Waived
S2	Carbofuran	0,999,999	Waived
S2	Chlordane	0,999,999	Waived
S2	Dalapon	0,999,999	Waived
S2	Di(2-ethylhexyl)adipate	0,999,999	Waived
S2	Di(2-ethylhexyl)phthalate	0,999,999	Waived
S2	Dibromochloropropane (DBCP)	0,999,999	Waived
S2	Dinoseb	0,999,999	Waived
S2	Diquat	0,999,999	Waived
S2	Endothall	0,999,999	Waived
S2	Endrin	0,999,999	Waived
S2	Ethylene Dibromide (EDB)	0,999,999	Waived
S2	Glyphosate	0,999,999	Waived
S2	Heptachlor	0,999,999	Waived
S2	Heptachlor Epoxide	0,999,999	Waived
S2	Hexachlorobenzene	0,999,999	Waived
S2	Hexachlorocyclopentadiene	0,999,999	Waived
S2	Lindane	0,999,999	Waived
S2	Methyoxychlor	0,999,999	Waived
S2	Molinate	0,999,999	Waived
S2	Oxamyl	0,999,999	Waived
S2	Pentachlorophenol (PCP)	0,999,999	Waived
S2	Picloram	0,999,999	Waived
S2	Polychlorinated biphenyls (PCBs)	0,999,999	Waived
S2	Simazine	108	9 years
S2	Thiobencarb	0,999,999	Waived
S2	Toxaphene	0,999,999	Waived
S2	2,3,7,8-TCDD (Dioxin)	0,999,999	Waived
S2	2,4-D	0,999,999	Waived
S2	2,4,5-TP (Silvex)	0,999,999	Waived
S2	Diazinon	0,999,999	Waived

§64432. Monitoring and Compliance--Inorganic Chemicals.

(o) Transient-noncommunity water systems shall monitor for the inorganic chemicals in Table 64431-A as follows

(1) All sources shall be monitored at least once for fluoride;

(2) Surface water sources for parks and other facilities with an average daily population use of more than 1000 people and/or which are determined to be subject to potential contamination based on a sanitary survey shall be monitored at the same frequency as

Attachment No. 7

CEQA Documents

NOTICE OF EXEMPTION

(Categorical)

TO: Office of Planning and Research
P.O. Box 3044
Sacramento, CA 958112-3044

FROM: CA Department of Public Health
San Diego District Office
1350 Front Street, Room 2050
San Diego, CA 92101
Contact: Sean Sterchi
Phone number: (619) 525-4159

SCH#: tba **WATER SYSTEM #:** 3710011

PROJECT TITLE: Operation of Replacement Well No. 8

PROJECT LOCATION: In the vicinity of Kumeyaay Highway and Mccain Valley Road, within the community of Jacumba, County of San Diego

PROJECT DESCRIPTION: The California Department of Public Health (Department), as the responsible agency, will be issuing a water supply permit. The Jacumba Community Service District proposed project is for the replacement of Well No. 6 with Well No. 8.

PUBLIC AGENCY APPROVING PROJECT AND CARRYING OUT PROJECT: This is to advise that the Department has issued a water supply permit **05-14-13PA-004** for the above described project on **04/8/2013**, and concurs with Jacumba Community Service District that the project is exempt from the California Environmental Quality Act.

Categorical Exemption Status:

- ☐ Class 1 Existing Facilities
  (CCR, Title 14, Sec 15301 and Title 22, Section 60101 (a))
- ☒ Class 2 Replacement or Reconstruction
  (CCR, Title 14, Sec 15302 and Title 22, Section 60101 (b))
- ☐ Class 3 New Construction or Conversion of Small Structures
  (CCR, Title 14, Sec 15303 and Title 22, Section 60101 (c))
- ☐ Class 4 Minor Alterations to Land
  (CCR, Title 14, Sec 15304 and Title 22, Section 60101 (d))
- ☐ Class 6 Information Collection
  (CCR, Title 14, Sec. 15306 and Title 22 Section 60101)

Reason why project is exempt: The operation of Replacement Well No. 8 will not have a significant effect on the environment.

The California Department of Public Health is a responsible agency for this project and is not responsible for the Department of Fish and Game filing fees.

LEAD AGENCY: Jacumba Community Service District
CONTACT PERSON: Tom Lindenmeyer
PHONE NUMBER: (619) 766-4359

Signature: _____ Date: 4/8/13

Name: Sean Sterchi Title: Senior Sanitary Engineer

APPENDIX C

2010 Sanitary Survey

State of California—Health and Human Services Agency
California Department of Public Health

MARK B HORTON, MD, MSPH
Director

ARNOLD SCHWARZENEGGER
Governor

October 20, 2010

Mr. Tom Lindenmeyer
General Manager
Jacumba Community Sanitation District
1266 Railroad St
Jacumba, Ca 91934

Dear Mr. Lindenmeyer:

JACUMBA COMMUNITY SANITATION DISTRICT, SYSTEM NO. 3710011
2010 SANITARY SURVEY

On July 15th, 2010, Mr. Scott Ketcham, a Sanitary Engineer with the California Department of Public Health, Drinking Water Field Operations Branch (CDPH), conducted a sanitary survey of Jacumba Community Sanitation District (Jacumba) accompanied by General Manager Mr. Tom Lindenmeyer and Operator Juliana Creamer. We thank you and your staff for extending full cooperation during the inspection.

During the sanitary survey CDPH inspected Jacumba's reservoirs, pumps, and distribution system. Evaluations were performed of Jacumba's cross-connection control program, facility security, emergency response plans, system operator certifications, and various operations and maintenance programs.

Jacumba is currently operating under a domestic water supply permit that was issued by CDPH on December 30, 2002.

After inspecting the facilities, speaking with operations staff, reviewing the operations records, correspondence file, water quality data, and compliance records, CDPH has determined that Jacumba is well maintained and operated. The following is a summary of our findings, along with action items and recommendations, which must be addressed to better protect public health and improve system reliability.

I. Source

1. Physical

Jacumba's source consists of a single active groundwater well (Well 4) and one standby well (Well 6).

Division of Drinking Water and Environmental Management
1350 Front Street, Room 2050 San Diego, CA 92101
(619) 525-4159 (619) 525-4383 Fax
Internet Address: www.cdph.ca.gov

In 2009, Jacumba began the installation of 2 additional wells to the water system. These are identified as Well 7 and Well 8 in the table below. Upon investigation it was found that the water temperature in Well 7 was approximately 84° F. Water quality was otherwise acceptable however Jacumba has decided to designate the well as inactive and possibly use the well as a future source or backup source by blending to reduce water temperature.

CDPH understands Jacumba plans to develop Well 8 as an additional source. Jacumba has determined the iron and manganese levels in this well will ultimately require that a treatment system be installed and Jacumba is pursuing funding with the U.S. Department of Agriculture for this purpose. A permit amendment has not been issued and Well 8 is limited to development and water quality testing purposes until Jacumba can address the issues outlined in CDPH permit amendment application review letter dated November 16, 2009.

Well	*Status*	*Capacity gpm*
1	Abandoned	-
2	Abandoned	-
3	Inactive	-
4	Active	200
5	Inactive	-
6	Standby	600
7	Monitoring	-
8	Pending	-
Total Capacity		200

2. Capacity

The yield of Well 4 has been rated at 200 gallons per minute and Jacumba has 670,000 gallons of storage capacity. Theses two elements provide the system with a total source capacity of 958,000 gallons per day.

The California Waterworks Standards requires public water systems to have the capacity to meet the system's Maximum Day Demand (MDD) at all times, and systems with less than 1,000 service connections to meet the MDD with storage capacity. MDD is determined based on the highest MDD reported for the last 10 years; however, only 4 years of data was reviewed for Jacumba. Based on this information, Jacumba's reported MDD of 210,000 gallons occurred in August of 2007

Based on a total storage capacity of 670,000 gallons, Jacumba has the ability to meet MDD, as required by the California Waterworks Standards, provided the reservoirs are at full capacity.

Based on Jacumba's reported Maximum Day Demand (MDD) of 210,000 gallons for August of 2007, the PHD can be calculated. PHD is determined by dividing the MDD by 24 hours and applying a peaking factor of 1.5. For August 2007, the calculated PHD is 13,125 gallon / hour (gph) (210,000 gallons/ 24 hours x 1.5).

Jacumba's total source capacity is 12,000 gph and the total storage capacity is 167,500 gph (670,000 gallons/4 hours under PHD conditions). Therefore, Jacumba's total source capacity under PHD is 179,500 gph (12,000 gph + 167,500 gph). Based on the calculated total source capacity, Jacumba has the ability to meet PHD for at least four hours (179,500 gph is greater than 13,125 gph), provided the reservoirs are at full capacity.

3. Quality

The water quality of Jacumba's wells is highly variable depending on the location of the well and its depth. Well 4 is sited in a shallow alluvial aquifer that is layered above a granitic batholith aquitard. Well 4 does not have any Maximum Contaminant Level (MCL) violations, but has a pattern of total coliform positive events. Well 6 is sited in a deep fractured rock aquifer that is under volcanic influence. Well 6 has MCL violations for odor threshold, fluoride, and toluene. Additionally, Well 6 has a pH of 9.5, a temperature of 95° F, and a strong sulfuric odor. These combined factors result in the water of Well 6 having a high chlorine demand.

4. Groundwater Under the Direct Influence of Surface Water

Well 4 is sited in a thermal spring fed vernal pool depression that has historically been described as a swamp. The spring discharges into the basin at a location that is approximately 320 feet to the northeast of the well. The "gully" area is currently the receiving basin for stormwater runoff from Old Highway 80. During precipitation events stormwater is discharged approximately 75 feet east of the well.

These discharges are of concern due to the combination of a high ground water table surrounding the well (i.e. depth of 10 feet in summer and 8 feet in winter) and the extremely high percolation rate (i.e. less than 1 minute per inch) of the shallow aquifer. Soils with high percolation rates do not provide the level of filtration and natural pathogen attenuation of unconsolidated soils. Therefore there is the potential for pathogenic organisms to short circuit through the aquifer and enter directly into the well.

Additionally, though the Department of Water Resources Water Well Standards (Bulletins 74-81 & 74-91) require a sanitary seal to a

minimum depth of 50-feet. Based on historic documentation, the sanitary seal of Well 4 may not exist or may only extend to a depth of 20-feet.

These factors of the well's physical location, soil type, and lack of adequate sanitary seal elevate the potential of the well to be Groundwater Under the Direct Influence of Surface Water (GWUDI).

In the case of Well 4, the GWUDI concern is further elevated due to a historic trend of pre-chlorination total coliform positive events. In the past decade, Well 4 has had a dozen positive total coliform events: one in 2001, three in 2002, two in 2004, four in 2005, one in 2009, and one in 2010. The 2009 and 2010 events are believed to be related to recharge events in the "gully". The 2009 event may be related to heavy recharge associated with a wet winter. The 2010 event occurred after the April 4th, 2010 earthquake when neighboring Well 6 became artesian and began spilling into the area next to Well 4.

Due to these combined factors, CDPH has determined that Well 4 is most likely GWUDI. Wells determined to be GWUDI must meet the requirements of the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which includes treatment, monitoring and reporting.

5. Inactive and Abandoned Wells

Jacumba has two inactive wells and two abandoned wells. The historic record for all four of these sites does not appear to indicate that the wells were abandoned in accordance with Department of Water Resources Bulletins 74-81 and 74-90

- Wells 3 & 5 are both inactive wells that are 100 feet and 300 feet east, respectfully, of the system's primary well, Well 4.
- Wells 1 & 2 are abandoned wells within 1 mile of the active well sites.

Action Items:

By December 31, 2010, Jacumba must submit a plan for providing treatment of water produced by Well 4 to meet the requirements of LT2, a plan for developing a new source that meets all primary and secondary standards to replace Well 4, or a monitoring plan to demonstrate Well 4 is not GWUDI.

The treatment plan must include a description of the disinfection system and inactivation calculations. The link below leads to an EPA

approved excel-based chlorine contact time calculation resource that can be used for performing the require inactivation calculations.

http://www.epa.gov/ogwdw/disinfection/gwr/pdfs/calculator_gwr_contact_time_calculator_v9.xls

The monitoring plan must include a schedule for monitoring gross physical properties, i.e. pH, temperature, conductivity, and Microscopic Particulate Analysis (MPA) including Giardia and Cryptosporidium assays. The monitoring schedule must capture rainfall events along with any flooding near the wellhead that may occur throughout the season. Please be advised that monitoring results may be inconclusive and result in a final determination of GWUDI solely based on the well's construction, soils and proximity to surface water sources.

Also, please be advised that LT2 allows for 0.5-log pathogen removal credit (Giardia and Crypto) for a state-approved Watershed Control Program, which requires a Watershed Sanitary Survey and Control Measures, e.g. relocating the stormwater discharge piping to a location that would no longer impact Well 4, etc.

By December 31, 2010, must submit a plan for the destruction of Wells 1, 2, 3 & 5 in accordance with Bulletins 74-81 and 74-90.

II. Treatment

During CDPH's 2010 inspection, no deficiencies were noted.

Per permit 05-14-02P-015: Provision 3: Jacumba must provide continuous chlorination of Well 4 in order to provide a chlorine residual in their distribution system.

III. Distribution & Pipelines

During CDPH's 2010 inspection, no deficiencies were noted.

1. Pipelines

Based on historic documentation and system accounts, the distribution system consists of a mixture of asbestos concrete (45%), PVC Schedule C-900 (45%), PVC schedule 40 (8%), and ductile iron (2%). The majority of the distribution network is comprised of 4-inch to 20-inch diameter mains.

Jacumba has 6 dead-ends, but only has blowoffs or fire hydrants at 5 of these locations. According to Jacumba's Annual Report to the Drinking Water Program (ARDWP) flushing is performed every six-months.

IV. Tanks

During CDPH's 2010 inspection, no deficiencies were noted.

Reservoir	Capacity (MG)	Year Installed	Date of Last Inspection	Date of Last Cleaning
Tank B	0.43	1994	2005	2005
Tank A	0.24	2005	-	-

Recommendation:

Per AWWA Standard D100-05, it is recommended that all reservoirs be internally and externally inspected every 3 years.

V. Pumps, Pump Facilities and Controls

During CDPH's 2010 inspection, no deficiencies were noted.

VI. Monitoring and Reporting

Distribution System Bacteriological, Disinfection By-Products, and Lead & Copper were reviewed and no deficiencies were noted.

1. Jacumba performed the last cycle of lead and copper distribution system monitoring in August 2007. The next cycle of lead and copper monitoring must be performed between June 1st and September 30th, 2010.

2. Based on a population of 550 consumers serviced through 267 connections, and per a CDPH approved Bacteriological Sample Siting Plan, Jacumba collects 3-monthly distribution system bacteriological monitoring samples and one monthly pre-chlorination sample at Well 4.

3. Jacumba performs disinfection byproduct monitoring on an annual basis. In the six-year period between 2004 and 2010, Jacumba has not exceeded the Total Trihalomethanes (TTHM) or Haloacetic Acids (HAA) Running Annual Average (RAA) MCL. In this six-year period the TTHM and HAA RAAs were 44.2 ppb and 13.6 ppb, respectively. Jacumba's current disinfection byproduct sampling plan was last updated in October of 2008.

4. The Groundwater Rule (GWR) went into effect on December 1, 2009, and Jacumba Community Services District is now subject to its requirements. In e-mails sent on June 3, 2009 and December 14, 2009, as well as a letter on December 29, 2009, CDPH provided guidance on the GWR. This guidance informed systems intending to comply with the triggered source water monitoring requirement by collecting representative samples to submit a GWR compliance plan

to CDPH for review. As CDPH has not received such a plan from your water system to date, Jacumba Community Services District will be required to comply with the GWR triggered source water monitoring requirement by collecting a raw water sample at each operating well within 24 hours of notification that a routine distribution system sample is total coliform positive.

5. In July of 2010 Jacumba submitted their Initial Distribution System Evaluation (IDSE) report as required under Stage 2 of the Federal Disinfectants and Disinfection Byproducts Rule (DBPR). By October 1, 2013 Jacumba must complete a Stage 2 Compliance Monitoring plan and begin complying with Stage 2 monitoring requirements. CDPH is reviewing the proposed monitoring locations and frequency included in the IDSE Report and will provide guidance based on our completed review under separate letter.

VII. System Management and Operation

1. Jacumba's cross-connection program is currently overseen by Jed Spicer, a certified cross-connection control specialist. According to the 2009 ARDWP, Jacumba met the annual requirement for testing all 3 backflow prevention devices. The last cross connection control survey of Jacumba was last performed in 1992.

2. Jacumba's Emergency Response Plan was revised in 2005 and no deficiencies are noted.

3. According to ARDWP data, Jacumba's maximum day water consumption rate is 31% of the storage capacity, but is only 2% of Jacumba's combined storage and source capacity.

Year	Maximum Day (MG)	Maximum Month (MG)
2003	0.20	35
2007	0.21	27.8
2008	0.15	27.6
2009	0.13	24.9

VIII. Operator Certification Requirements

1. Treatment

Jacumba only provides wellhead chlorination; therefore, Jacumba is not required to comply with the Certified Treatment Operator regulations. However, Jacumba is staffed by the following Certified Treatment Operators:

Treatment	Name	Operator No.	Grade	Expiration Date
	Tom Lindenmeyer	13900	T2	6/1/2013
	Julianna Creamer	27566	T2	7/1/2012

2. Distribution

In accordance with §64413.3 (a) & (b), due to population served (less than 1,000), Jacumba is classified as a D1 system.

Distribution System Classification	Minimum Certification of	
	Chief Operator	Shift Operator
D1	D1	D1

(Excerpt from Table 63770-A)

Jacumba has designated Julianna Creamer (D2), as chief operator who meets or exceeds staffing requirements (§64413.7 (a) & §63770).

Jacumba is adequately staffed by the following:

Distribution	Name	Operator No.	Grade	Expiration Date
	Tom Lindenmeyer	16120	D1	*
	Julianna Creamer	27463	D2	1/1/2012
	Don Shirley	16119	D1	6/1/2010

*Tom is not listed as certified distribution operators on the CDPH website http://www.cdph.ca.gov/certlic/occupations/Pages/dwopcert.aspx

Please respond in writing **by December 31, 2010** regarding when and how the deficiencies outlined above will be addressed. If you have any questions regarding any of the items discussed above, please feel free to contact Alan Tell or me at (619) 525-4922.

Sincerely,

Sean Sterchi, P.E.
District Engineer

Enclosures:
Cross Connection Control Program Evaluation

cc: Mark McPherson, Chief, Land and Water Quality Division, County of San Diego, Department of Environmental Health

APPENDIX D

Construction Cost Estimate Breakdown

Appendix D
Detailed Cost Estimate Breakdown - Construction Costs

No.	Item	Qty	Unit	Unit Price	Total Price
1	Mobilization/Demobilization	1	LS	$12,000	$12,000
2	Clearing and Grubbing	1	LS	$2,000	$2,000
3	Earthwork/Grading	80	CY	$50	$4,000
4	Construction Survey & Staking	1	LS	$5,000	$5,000
5	Concrete	30	CY	$800	$24,000
6	Furnish and Install Manganese Filtration System	1	LS	$330,000	$330,000
6.1	*Filter Vessel and Media*	*1*	*LS*	*$120,000*	*$120,000*
6.2	*Backwash Tank*	*1*	*LS*	*$50,000*	*$50,000*
6.3	*Chemical Feed System*	*1*	*LS*	*$20,000*	*$20,000*
6.4	*Air Compressor, Piping and Appurtenances*	*1*	*LS*	*$10,000*	*$10,000*
6.5	*Equipment Installation*	*1*	*LS*	*$130,000*	*$130,000*
7	Contractor Sampling & Testing	1	LS	$5,000	$5,000
8	Furnish and Install Ground Mount Solar Panel Grid-Tie System with Accessories	1	LS	$208,000	$208,000
8.1	*Solar Panels, Inverters, Rack Mounting, Cables*	*1*	*LS*	*$112,000*	*$112,000*
8.2	*Grid-Tie System, Permit, Remote Monitoring and Accessories*	*1*	*LS*	*$10,000*	*$10,000*
8.3	*Equipment Installation, Tax and Margin*	*1*	*LS*	*$86,000*	*$86000*
9	Install Solar Panel Array & Backwash Pond Site Fencing	700	LF	$60	$42,000
10	Well No. 7 Improvements	1	LS	$100,000	$100,000
10.1	*40 HP Submersible Pump and Motor Installation*	*1*	*LS*	*$20,000*	*$20,000*
10.2	*Depth Monitor System and Pump Control*	*1*	*LS*	*$10,000*	*$10,000*
10.3	*Well Head Improvements, Piping and Appurtenances*	*1*	*LS*	*$15,000*	*$15,000*
10.4	*Electrical and Controls Testing*	*1*	*LS*	*$5,000*	*$5,000*
10.5	*Equipment Installation*	*1*	*LS*	*$50,000*	*$50,000*
11	Electrical Improvements for Manganese Filtration System and Ground Mount Solar Panel Grid-Tie System with Accessories	1	LS	$15,000	$15,000
11.1	*Connect Solar Panel System to Grid and Manganese Filtration System*	*1*	*LS*	*$5,000*	*$5,000*
11.2	*Electrical Testing and Commissioning*	*1*	*LS*	*$2,500*	*$2,500*
11.3	*Installation*	*1*	*LS*	*$7,500*	*$7,500*
12	Furnish, Install, Test, and Commission Emergency Back-up Diesel or Propane Generator - 242 kVa, 194 kW, 1 & 3 Phase Generator	1	LS	$125,000	$125,000
13	Destroy Wells 1, 2, 3, and 5	1	LS	$25,000	$25,000
13.1	*Well 1*	*1*	*LS*	*$8,000*	*$8,000*
13.2	*Well 2*	*1*	*LS*	*$8,000*	*$8,000*
13.3	*Well 3*	*1*	*LS*	*$4,500*	*$4,500*
13.4	*Well 5*	*1*	*LS*	*$4,500*	*$4,500*
14	Replace 6,038 Feet of 4-inch Pipeline	6,038	FT	$42	$254,000
15	Replace 6 Butterfly Valves on Campo Street	1	LS	$9,000	$9,000
				Subtotal Construction Cost:	**$1,160,000**