Philip C. Salvatore

831 Emma Way

Ridgecrest, CA 93555

04 January 2020

Public Comments Regarding the Indian Wells Valley Groundwater Sustainment Plan January 2020

We are told by the local Groundwater Authority and our regional political leaders that there is no way we can conserve our way out of our current groundwater overdraft situation and that we have no alternative but to import water into our valley at great cost to all of us. I am going to suggest this is not necessarily the case. All of the planning I have seen assumes we will continue to use as much water in the future as we do today, perpetuating wasteful water use practices as if this is the only alternative we have. I will suggest this is not the case at all. We are told we may have to spend upwards of $200 million to build a water conveyance system, aka an aqueduct, to bring imported water to our basin and then spend upwards of $15 million per year to buy and move this water, or "wheel" the water to use the industry term, into the indefinite future. History suggests the final price will be much higher than that. I will suggest we can invest less than half that amount of money and avoid importing water altogether. Based on available data from the Todd Engineering report, Indian Wells Valley Land Use Management Plan DEIR, census data and readily available prices of solar systems and ductless air conditioning systems I am going to paint a little bit different picture of our future than valley political leaders have painted so far

One other comment regarding groundwater rights in California. Prior to SGMA there was no formal system of groundwater rights in this state. A property owner could pump any amount of water they wished out of the ground until a judge told them to stop or the well ran dry. Land owners are said to have overlying rights. "Appropriators" are those who pump water from the ground for use on property outside the location of the well, and the California courts have ruled that this includes municipal water districts who distribute water over tens or even hundreds of square miles from wells located inside and outside their distribution area. For a long time in the state overlying rights were assumed to have priority over appropriative rights. This changed with a California Supreme Court case called Pasadena v Alhambra. When groundwater basins experiencing overdraft led to litigation, the courts in California including the California Supreme Court have instead used a doctrine called "mutual prescription", where all water users in the basin have to reduce their draw on the aquifer in some proportion. This was done to protect municipal water utilities from being cut off from water supplies by landowners with wells in adjudicated basins claiming their overlying rights had priority over municipal users prescriptive rights. The California Supreme Court also ruled that "beneficial use" has to be considered in determining the degree of prescription. Not all users suffer the same degree of prescription depending on how a judge or court appointed water master determines how beneficial a particular party's water use is. There are some who even argue for example that growing alfalfa in the desert is not a beneficial use of water. We have heard some current users assert that since their water use predates the incorporation of Ridgecrest or the establishment of NAWS China Lake they are not required to surrender any of their current water use. Temporal

rights, the “first in use is first in right”, doctrine that generally governs surface water rights in the west does not apply to groundwater under California law. The Mojave Adjudication ruling from the California Supreme Court set a strict standard for adjudicating groundwater disputes in California. And as seen in the ongoing Antelope Valley Adjudication case, Federal water users can be sued in a state court. It is so far the only sort of case where a Federal entity has to be part of a lawsuit heard in a state court. Typically Federal agencies may not be sued in state courts. Water disputes are an exception.

First my ground rules and assumptions.

The population of Ridgecrest is 29,000, with 10,781 households (US Census data).

The population of the Indian Wells Valley including Ridgecrest is 36,000 (the DEIR claims the valley has “less than 35000 residents, I’m being conservative and assuming there may be more than that).

Current annual recharge into our ground water basin is 7300 Acre Feet Per Year (AFY). This is the lowest of several numbers being quoted for the sake of being conservative in my estimate.

The Navy / Ridgecrest wastewater treatment plant processes 2500 AFY of wastewater.

Current annual water use is as follows (from the Todd report)

Private Domestic Wells	1000 AFY
IWVWD and ICSD	8000 AFY
Ridgecrest Area Parks	350 AFY
NAWS China Lake	1800 AFY
Searls Valley Minerals	2600 AFY
Evapotranspiration	630 AFY
Domestic / Industrial subtotal	14,380 AFY
Domestic / Industrial Overdraft	7080 AFY

Domestic and Industrial water use at our current level of use is almost twice annual recharge and the reason our leaders claim we have no alternative but to import water. 9,000 AFY spread across 36,000 residents tells me we are, on average, using about 223 gppd. That corresponds to my experience with my first home here where I had a big Mastercool evaporative cooler and a front lawn. This is excessive water use.

I am not including the 20,000 AFY of agricultural water use predicted when the existing pistachio orchards reach maturity. More on that subject later.

With air conditioning instead of evaporative cooling, it is easy to achieve water use measured in Gallons Per Person Per Day (gppd) of 85 to at most 100 gppd . We achieve 85 - 90 gppd in our own home now with no special conservation measures.

City of Los Angeles currently realizes 78 gppd.

Los Angeles County currently realizes 105 gppd (unincorporated LA County including Antelope Valley).

An Acre Foot of water is the amount of water required to cover one acre of surface to a depth of one foot, which is equal to 325851 gallons.

Assume 90% of households use evaporative cooling, 10% us air conditioning (best assumption I could come up with from extensive reading).

California solar power in 2020 with rebates costs $3.07 per watt.

A 23,000 BTU ductless air conditioning system suitable for a 1200-1700 square foot home costs $5000 installed.

1000 watts of rooftop solar would produce enough power to make the switch from evaporative cooling to air conditioning energy neutral. User should not experience increased electric utility charges.

Here is what our water use would look like at 100 gppd and 85 gppd in AFY:

	100 gppd	85 gppd
Private Domestic well users, IWVWD , ICSD	4032	3428
Ridgecrest Area Parks	350	350
NAWS China Lake	1800	1800
Searls Valley Minerals	2600	2600
Evapotranspiration	630	630
Domestic / Industrial Subtotal	8750	8178
Domestic / Industrial Overdraft	1450	878

Domestic / Industrial use still causes a small overdraft but I have not mentioned using treated waste water yet. The wastewater plant co-owned by the US Navy and city of Ridgecrest processes about 2500 AFY of waste water. Assume with water conservation measures only 2000 AFY would be available for treatment. That is conservative because I am assuming indoor water use, the water that ends up going down our drains to the treatment plant, does not need to change to get us to 100 gppd or even 85 gppd. We do it now in our own home and we are not taking sea showers. The only differences between my current home and the old one aside from the new one being twice the size are lack of a front lawn and ac instead of evaporative cooling. Those two changes cut our water use by more than half. But for the sake of a very conservative estimate I will assume only 2000 AFY of wastewater will be available for treatment. For more than three decades the Orange County Water Authority has been treating their wastewater to a potable standard. It comes out so pure you can drink it. They even bottle it and serve it at meetings, plant tours and trade shows. This water is then pumped back into their

aquifer from which 75% of the county's drinking water is drawn. There needs to be a discussion with Searls Valley Minerals about how much treatment they would need for the water used in their process. Maybe they don't need potable water for their process and they can get by with less treated sewage? It is a question that needs an answer. They need to put some of their money into the pot to achieve this and not simply expect IWV residents to foot the entire bill for them. There also needs to be a discussion with San Bernardino County regarding domestic water use in Trona and Pioneer Point. It's not a lot of people but maybe San Bernardino County would want to do something like I am proposing to bring water use down there since their water comes from our basin. At 85 gppd there is almost no need to treat wastewater and no need to import water. Also note that if you subtract the water use by Searls Valley Minerals we are no longer in overdraft even at 100 gppd.

I think now the reader can see it is possible to realistically bring local domestic and industrial water use down below annual recharge. All it takes is the political will to do so. The State of California has a goal of bringing domestic water use down to only 55 gppd. That will be hard to achieve. At that level total domestic water use in the valley, meaning private domestic wells, IWVWD and ICSD falls from 2428 AFY at 85 gppd to only 2218 AFY. Total water use falls from 8178 AFY to 7977 AFY. At that level we are even closer to not even needing treated wastewater, especially if the Trona area is able to experience similar low water use (which I haven't calculated). I believe it would be foolish indeed for this region to spend hundreds of millions of dollars on new infrastructure that ends up being unnecessary in a decade or two.

By now you are asking how do we get to such low water use, since assumes both xeriscape and the elimination of evaporative cooling from homes. Good question. It will not be costless to accomplish, but it will be less than half the cost being proposed to build infrastructure to import water and that cost could be further reduced by a few ideas I will propose.

First off go back to our ground rules and assumptions. Ridgecrest has a population of 29,000 and 10,781 households. If the proportion of households to residents for the entire region matches that of Ridgecrest, the 36,000 residents of the valley should live in 13,383 households. I cannot find a census number for the number of households in the whole valley, only for Ridgecrest so I have to estimate it. Of those households, 90% or 12,045 will have evaporative coolers. The remaining 10% have ac. All of those evaporative coolers would need to be replaced to bring water use down to 85 gppd or lower and all new construction would have to use ac instead of evaporative cooling. To accomplish this I am proposing to replace existing evaporative cooling systems in households with a 23,000 BTU ductless air conditioning system sufficient to cool a 1,200 - 1,700 square foot home and add 1000 watts of roof top solar to generate the electricity necessary to make up the difference in the switch from evaporative cooling to ductless ac. I am not trying to cover all the electrical needs of the home, just keep the electric bill constant when ac is installed. Average installed cost of a 23,000 btu ductless ac system ranges from $3000 to $7000. Average cost is $5000. The current installed cost of solar power in California with rebates is $3.07 per watt. A 1000 watt rooftop solar installation therefore would cost $3070. A ductless ac system and 1 Kw of solar installed on a home would cost $8070. The full cost to convert every household in the valley with evaporative cooling, 12,045 households, to ductless ac and rooftop solar is $97.2 million. That is not a trivial number but it is less than half the cost we are being told is necessary to build a water conveyance system to our valley and after the money is spent there are no ongoing annual costs such as

those we would face to import water each year. Since we have 20 years to reach sustainability that $97.2 million would be spent over 20 years, meaning we would spend roughly $4.86 million a year. Keep in mind that after building a $200 million aqueduct imported water will cost us $15 million a year and there is no end to that cost. It's forever. Once homes are converted to ductless ac there are no more annual charges.

The public might not have to pay all of this cost. A program could be designed such that an owner would receive a subsidy to convert from evaporative cooling to ductless ac and solar if they agreed not to sell the property for some period of time, say five years or maybe seven years. Otherwise the home would have to be converted before it could be sold with the cost included in the sale price. If the owner sold before their five or seven years were up the water district or whichever agency paid for the installation would be authorized to recoup their costs from the sale of the property. The rules have to have some teeth. If we chose to use a 2/3 subsidy for home owners who agreed not to sell this would cost $64.8 million assuming all current owners agreed to not sell ($3.24 million per year). In reality many homes will change hands over time and those won't benefit from the subsidy therefore reducing the expense to the public. Perhaps instead we could agree to subsidize only half of the cost or less if the conversion is part of a change of ownership. The local real estate industry could provide us with an average number of sales of existing homes per year to use to refine this estimate. There are lots of possible subsidy scenarios with different menus of costs, all of which are lower than a system to import water. My complaint is that no serious conservation program has even been suggested much less analyzed in detail. We are told by valley leadership we need to import water to sustain excessive domestic water use in excess 200 gppd and that's that. End of conversation. No it isn't and my intuition tells me the state will reject our current plan, which it very much should.

I have not discussed the 20,000 AFY of agricultural water use. Non irrigated farm land in California sells for $3550 an acre. Prime irrigated farm land sells for $12,500 per acre. We have 1000 acres in alfalfa and 2500 acres in pistachios in this valley according to the Todd report. 3500 acres total. That land is worth $12.4 million if it is considered to be non-irrigated and $43.75 million if the land is considered irrigated. Our valley is not considered to be prime farmland according to the DEIR. The farmers expect us to build a $200 million aqueduct to water land worth at most $43.75 million, probably less. If one accepts that it is possible to import water for as little as $2000 per acre foot, the 20,000 AFY that will be required to irrigate our farmland would cost $40 million per year. At $4000 an acre foot farms would require $80 million per year for water. So we are expected to pay $200 million up front and the farms will pay $40 million to $80 million a year to irrigate land worth at most $43.75 million. Do those farms have the kind of revenues to afford $40 million a year for water? I don't think so, meaning that after we foot the bill for such an aqueduct the farmers won't be able to afford this imported water and will go out of business anyway.

Last point, we are told imported water might cost $2000 to $4000 an acre foot. Southern California water users pay MWD $10,000 to $12,000 an acre foot for the same water. Ask why our local leaders think we would be able to buy water at such a steep discount. $4000 an acre foot for imported water is not a believable number.

The purpose of this paper is to facilitate discussion in a direction our valley leadership has not even hinted at. All of the discussion to date has assumed we absolutely ***must*** build an expensive water conveyance system and pay many millions of dollars per year to import water to our valley so we can continue to use in excess of 200 gppd in our homes. Our leaders are proposing this to the state government in a state where the major

metropolitan areas under heavy pressure by that very same state government have all brought their water use down to half of what we use per person per day or less in many cases. I hope I have opened some eyes to the thought that we may not actually need to import water to have a sustainable future water supply and that it might be the wrong choice to do so.