

## AGM 2020 - Water Commissioner's Detailed Report

### Overview of 2019

During 2019 the "Water System" again continued to perform well with very few maintenance calls. There were a couple of extended service outages in La Calma due to breaks in the distribution tubing and a couple of water meters that needed to be replaced. The wells and pumping equipment continued to perform with only a few minor electrical problems. All Members were generally supplied with sufficient water to meet their needs throughout the year.

There were no planned projects undertaken during the year and only a minor rough-in started for a future larger distribution pipe in upper La Huerta to correct some flow and location problems with the current layout.

Still not resolved during 2019 were the two carry-over access issues that were initiated in 2016. Both are still tied up in the judiciary system awaiting court decisions. The most serious issue remains our inability to get a service vehicle into the La Calma well site if an emergency were to occur. To my knowledge, there was no progress on resolving this issue during the past year.

The other issue is our restricted access to the property where I keep the Asociación's tools and spare parts. I still have conditional legal access to the bodega by means of a judicial decision so the matter has little impact on the ongoing Water Operations activities. Both matters still need to be resolved.

### Well Performance

#### *How are the wells performing?*

The performance of the two active wells was again monitored closely throughout the year. With the assistance of Angel Contreras in La Calma and Byron Kirkham in La Huerta, three meter readings at each well site were recorded on a daily basis. These meters provide the following information:

1. The **volume of water** pumped (water turbine type flowmeter).
2. The **amount of electricity** consumed (CFE's electrical wattmeter).
3. The **length of time** that the pump runs ("run-time" hour meter).

With this data, I am able to calculate two very important performance statistics that tell me how the "Supply Network" (well, pump and pipes/tubing that deliver water up to the storage tank) is performing.

1. The pumping **efficiency** is the quantity of water (in cubic meters) that is delivered to the storage tank for each kilowatt hour of electricity consumed. The greater the number, the more "efficient" the "Delivery Network" is operating. This factor directly impacts the Asociación's costs to operate the well.
2. The **flow rate** is the quantity of water (in liters) that is pumped and delivered per second to the storage tank. This is an important statistic used to monitor the ongoing performance of the well over time. Consistency from month-to-month over the range of our demand is a good thing.

Many thanks to Angel and Byron for assisting me throughout the year with the taking of these readings. It takes a great deal of effort and time to do this on a near 365 days-per-year basis and the Membership is very fortunate to have these people to help me out.

However, we must plan for the future and to a time when this type of help may not be available. To address this pending issue, I have started to investigate various “state-of-the-art” technologies in an effort to design a system to automate the monitoring and recording of performance data of our wells from a central location.

The system I have initially selected for evaluation consists of readily available sensors that are installed at the well head that can take readings at predetermined time intervals. This data is then transmitted by means of a low power digital mesh radio network to a personal computer at a fixed location. The data can then be processed and used to generate reports, set alarms and monitor the ongoing performance of the water system.

I have a pilot project under test currently in order to better understand the operation of the system. This will allow me to tailor the system design to obtain what data we need to capture and develop operational procedures to support it. During 2020, I hope to install the result of this evaluation at each of the two active well sites.

### **La Calma Well**

During 2019, this well supplied a total demand for 9,345 cu. mtrs. with an overall efficiency of 1.16 cu. mtrs./kWhr. and average flow rate of 2.90 ltrs./sec. Total run time for the pump this year was 894 hours. The demand on the well ranged from a high of approx. 35 cu. mtrs./day in May to a low of 15 cu. mtrs./day in August.

For comparison purposes, during 2018 the well supplied 7,451 cu. mtrs. with an overall efficiency of 1.40 cu. mtrs./kWhr. and average flow rate of 3.57 ltrs./sec.

I have been watching the performance of this well very closely over the past few years because it has a known history of performance issues. By keeping pump cycle times relatively short and daily demand below 30 cu. mtrs./day, it has been very stable in its performance for the past few years. In early March, I saw a noticeable drop in efficiency and flow rates. This means, all of a sudden we were using more electricity and running the pump longer to get the same amount of water out of the well. At the time, we suspected that the two new agricultural wells that were completed in early 2019 just below the La Calma well (about 350 mtrs. away) may have come on-line and could be causing an issue with the water table.

Through the dry season and subsequent months up until late fall, the well continued to show erratic performance. A well services company from Guadalajara (Las Fuentes) was contacted and examined all three of our well sites. Their initial recommendation was that we need to develop a better understanding of what is happening with the water table. To do this, it is necessary to continually monitor the “resting” or “static” height of the column of water inside the well casing. It is also necessary to know how fast the water flows into the well, the “recovery” rate, after each pumping cycle. It is an expensive process to have a well technician continuously monitor these parameters so the Board decided to purchase a specialized instrument to mount on the well head. This instrument uses “sonar” technology to read the height of the water column in the well casing on a continual basis and store the

data for review later. In December, an instrument was obtained from a manufacturer in the U.S. (eno Scientific) and has recently been installed on the well head to begin to collect data. I will be able to monitor this important information over a period of time and develop a better understanding of what may be happening to the water table in La Calma. Stay tuned for more information during 2020.

### **La Huerta Well**

During 2019, this well supplied a total volume of 14,768 cu. mtrs. with an overall efficiency of 1.48 cu. mtrs./kWhr. and average flow rate of 5.19 ltrs./sec. Total run time for the pump this year was 790 hours. The demand on the well ranged from a high of approx. 70 cu. mtrs./day in April to a low of 18 cu. mtrs./day in August.

For comparison purposes, during 2018 the well supplied 13,315 cu. mtrs. with an overall efficiency of 1.47 cu. mtrs./kWhr. and average flow rate of 5.42 ltrs./sec.

Coming into this year, we were plagued with an abnormally high rate of power failures that resulted in service outages at this well site. After each power failure, I had to replace damaged components of the motor control. Upon extensive investigation, the problem seemed to be either inadequate grounding or CFE related issues with the electricity supplied to the well on one of the three phases. A well service company was brought to the site to check the installation and CFE was called to test the supply transformer grounding. Nothing conclusive was found so I did some maintenance of the system grounds and modified the wiring of the actuator coil in the contactor to try and isolate the problem. It appears that I resolved the issue as there have been no further problems since July.

This well continues to deliver in excess of 100 cu. mtrs./day on a few occasions during the dry season when demand is high and appears to do it without complaint. The water from this well has a fairly high TDS (Total Dissolved Solids) count which means it is "hard" water and as a result "Users" may note a slight build-up of a reddish "slime" called iron bacteria in their pipes. Periodic testing has shown though that the soluble heavy metals levels are lower than the allowable maximums specified in the Mexican Federal Standard NOM-127-SSA1-1994 for potable water. The well also has exhibited higher than acceptable levels of microbiological contamination (Total Coliforms and Fecal Coliforms) so precautions need to be taken to prevent gastrointestinal issues from consumption. For now, this well continues to meet expectations for the quantity of water extracted. In my opinion, there is little more we can do to improve on this without getting into cumbersome and expensive water treatment systems.

### **Camino Real Well**

During 2019 this well was not operated and it has been many years since it was last used. I have no information on its current condition or ability to produce any significant amount of water. I had a Hydrogeological Engineer visit the site during the year to give me a recommendation on what to do with it (inspect, clean?). After evaluating the terrain in that area he suggested it was a poor location for a well and not to spend any funds on evaluating or trying to recommission it.

The site of this well is also the preferred location upon which to build a future water storage "facility" to replace the Loop's aljibe, the location that the "Asociación" is currently using for the La Huerta side of

the *Water System*. In 2018, the site was fenced off in an effort to “stake a claim” to it for future uses in recognition of the land claim issues that are being litigated in the community.

## **Water System Performance Review**

### ***What happened with the Supply Network in 2019?***

The “*Supply Network*” is the portion of the “*Water System*” that takes water from the wells to the storage tanks.

In February, a massive leak developed in La Calma at a 45 degree turn in the supply line near Casa Handy. Upon investigation, a crack was found in a pipe coupling that was probably due to pressure stress on the coupling because of loose soil movement. A contractor was hired to make the necessary repairs but the first attempt failed. As a result, some Members were without water for a few days until a satisfactory repair was completed. In December, a minor problem with the float installed in the La Calma tank resulted in a short service outage. Many thanks to Doug Reno and Mike Jones for doing this repair as I was out of the country at the time.

There were no problems with the “*Supply Network*” in the La Huerta side of the system during the year.

### ***What happened with the Distribution Network in 2019?***

The “*Distribution Network*” is the portion of the “*Water System*” that delivers water from the storage tanks to each Member’s property line.

As a guide to detecting possible problems, I compare the pumping volumes from each well to the sum of all of the individual meter readings that are taken at the first of each month. The difference in these numbers is referred to as the “Loss” and can be attributed to one of three possible factors: leaks, metering inaccuracy or theft. This is of particular concern since the Asociación has to remit extraction taxes to CONAGUA based on how much water we pump from the wells, not what we use.

During 2019 we “lost” 2,998 cu. mtrs. (8.2 cu. mtrs./day, 20.3% of what was pumped) in the La Huerta branch and 2,572 cu. mtrs. (7.05 cu. mtrs./day, 27.5% of what was pumped) in the La Calma branch. The extraction taxes we had to pay CONAGUA on this loss was \$17,164 pesos. In addition to this is the cost of the electricity it took to pump that water, 4,242 kWhrs., an expense that is also non-recoverable.

For comparison purposes, during 2018, we “lost” 2,429 cu. mtrs. (6.82 cu. mtrs./day) in the La Huerta branch and 1,169 cu. mtrs. (3.28 cu. mtrs./day) in the La Calma branch.

The “loss” was exceptionally higher in La Calma during the year due to a couple of problems noted previously as well as a major leak that occurred in March in the distribution pipe along Calle La Paz. In this case, a previous repair that must have been made many years ago failed. The old style cast iron pipe repair couplings rusted through resulting in the failure of the rubber seals.

Over and above these types of major leaks, the loss of water is due to a combination of inaccuracies in metering and overall degradation of pipe seals and joints causing small leaks or seepage in the “*Distribution Network*”. The Membership is encouraged to remain vigilant and report any leaks or theft that they become aware of to one of your Board of Directors immediately.

## **System Improvements**

### ***What improvements were done to the system during 2019?***

As was mentioned in the discussion of the La Huerta well, a change was made to the motor control electrics to try and reduce the number of equipment failures we have been experiencing due to CFE power issues on their supply lines and/or system grounding. So far these changes seem to be working. I also replaced the remaining portion of plastic supply pipe (deteriorating and leaking) with galvanized steel pipe and installed an additional concrete pipe support column.

### ***What improvements do I feel need to be done in 2020?***

There still remains much work to be done with the relocation of some "Access Links" (water meter installations) to more accessible locations at or near the edge of property lines, changing out older meters and installing back-flow preventers and proper shut-off valves.

While there remains only one "Access Link" in La Calma that needs to be moved and upgraded (Casa Nguyen), there are still a number of aging meters in use in La Huerta that also have no back-flow preventers or security and/or shut-off valves. Many of these are also inside property lines and not easily accessible. This work is time consuming and difficult but during 2020 I hope to complete additional work on this program as time and available funds allow.

Water is currently supplied to Casa Neely and Casa Thomson by means of a booster pump located in the aljibe at Casa Loop. This pump is not run on a demand basis but is set to run for a predetermined time per day to refill the aljibes at both properties. As a result, electricity can be wasted running the pump if there is no demand for more water on any given day. During 2019, this pump consumed 423 kWhrs. to deliver 1,093 cu. mtrs. of water (efficiency of 2.58 cu. mtrs/kWhr.). During 2020 I would like to examine the feasibility of installing a small tank at the Camino Real site to gravity demand feed those two homes and use a simple level control system to automatically control this pump. There may be a savings in electricity cost by doing this.

## **Water Quality**

### ***How safe is the water to drink?***

One of the "Terms and Conditions" of our well concessions with CONAGUA is that we conduct a complete analysis of extracted water from each well at least once every two years. The last test was done in August 2018 but the test results were not received from the Agua Jalisco lab until January 2019. There is no cost to the "Asociacion" if requesting these tests through the Water Dept. of the Municipality of Poncitlan but the drawback with this process seems to be the long turnaround time to receive the results.

At the time of sampling, test results confirm that we continue to exhibit microbiological contaminants in the La Huerta well but none in the La Calma well. Agua Jalisco has in the past "recommended" that we inject chlorine at the well head to reduce this level of contamination to zero - if the water if it is to be used for human consumption. Since we have neither the funding, nor the manpower to undertake

doing this at the current time, I recommend that all residents on the La Huerta side of the system should either operate some form of water purification system in their home or drink only bottled water from reputable suppliers.

## **Security**

### ***How secure is our system?***

The *Asociación's* well sites and storage facilities are all protected from vandalism, within the limits of practicality. In my opinion, there remains only one area of exposure to risk remaining - the water storage facility for La Huerta that is located under the garage area at Casa Loop.

Access to the garage is not under the complete control of the "*Asociación*" and as such it remains an area of vulnerability. The Loops have indicated a desire to sell their property once the land dispute is resolved so it may be necessary to discontinue the use of this aljibe at some time in the future.

## **Future Capital Projects to Consider**

### ***Relocate the Storage Facility for La Huerta***

As discussed above, the *Asociación* will eventually need to construct a new storage facility somewhere in upper La Huerta that has a capacity of up to 100 cu. mtrs. This proposed project has been under discussion by the Membership since the 2012 AGM. It has not yet moved forward since there is no immediate urgency to do this until the property can be sold. There is also a reluctance to spend the money to move forward with this project until it has to be done. Previous Board of Directors examined a number of alternative locations and system designs and determined that the most economical and logistically viable solution would be to locate a water storage facility over the old Camino Real well site (corner of Calle Camino Real and Calle Las Flores). Moving this facility will also require the movement of the level control equipment, construct additional new pipe lines as well as the possible addition of a few more pressure reducers at "*Access Links*" in the lower reaches of the "*Distribution Network*".

### ***Increased Capacity for Distribution Network in Upper La Huerta***

As a companion project and possibly prior to the relocation of the storage facility, I recommend that the *Asociación* install an additional 3" PVC line adjacent to the existing supply line along the edge of Calle Camino Real. This line would extend from the new storage facility at the Camino Real well site (corner of Calle Camino Real and Calle Las Flores) to the top of the hill at the property line between Ray & Cheryl Miller's and Joan Gutierrez. The existing line that comes from the Loop's aljibe is only 2" in diameter and runs across all the private properties adjacent to Camino Real. This line should be in a common area.

There is also only one known "drop" of 2" PVC running from upper La Huerta down through the group of homes in the "Chirimoyo" community, again across private property. Due to its limited capacity, this causes erratic flow levels and pressure drops to some directly connected homes in the community during peak demand periods. There is also not enough working shut off valves in this part of the Distribution Network to allow for effective bypassing of water flow during maintenance activities. I

therefore also recommend the installation of a second “drop” of 3” PVC from the line along Camino Real down to the existing line along the internal road in the “Chirimoyo” community. The ideal location for this would be in the existing arroyo near the property line of the McCamis and Rohac properties. During the installation of concrete drainage tubes in part of the arroyo earlier this year (a private party undertaking), I took the liberty of setting 18 mtrs. of 3” PVC tubing in consideration of this possible future project.

### ***New Well in La Calma***

As mentioned in the discussion about the performance of the La Calma well, we may be experiencing the early signs of the eventual failure of this well. The water table monitoring project just started should allow us to better understand what may be going on in order to make a recommendation for a future course of action in a few months’ time.

### **In Closing**

One of the other things I keep track of is the status of the various “Lots” that are in the “Water System”. As of December 31<sup>st</sup>, 2019 there were 53 “Lots” with “Access Links”, 1 of which is currently suspended at a residence that is partially built and uninhabited. This leaves a balance of 52 “Lots” that are currently receiving water from the system.

There remains an additional 30 vacant “Lots” that have “Responsible Members” who have continued to keep up their support of the *Asociación* over the past few years by staying current with all Capital Assessments and annual Membership Fees.

And finally, a few words on another one of my tasks on the Board, Voter Eligibility for the upcoming Annual General Assembly. Of the above 83 currently recognized “Lots”, there were 75 that have “Responsible Members” who were fully paid up as of Dec. 31<sup>st</sup> and therefore considered to be “Members in Good Standing” and eligible to vote. Of the 8 Lots not eligible to vote, there were 2 Lots with “Access Links” and 6 vacant Lots that had not paid their 2019 Annual Assessment Fees as of December 31<sup>st</sup>.

I continue to enjoy working with many of the residents and contractors in this community and to provide my assistance with maintenance and evolution of your “Water System”.