

Executive Summary

Established in 1952, Durham Pump Inc. is a full service, design build contracting company. For over 50 years we have supplied and serviced agricultural, commercial, and municipal pump users in California. Durham Pump provides innovative systems.

In January of 2004 I received a request from the board to attend a meeting with them. At that time they informed me that they felt the water company was not receiving adequate service from Durham Pump. I informed the board that they were not receiving any service from Durham Pump since the water company did not have a service contract with us. We have in the past only responded when we were called to repair an existing problem. I highly recommended that the water company contract us to perform the regular pump system service and maintenance. At that time the board was concerned about the water system and wanted to know more information about the system. Since Durham Pump installed and has provided repair service for much of the water delivery system for 20+ years we have extensive records about the system. Also I have done repairs to the system over the last 14 years and have a very good understanding of how the system was constructed and the current condition of the equipment.

Working with the board we started by taking a "snapshot" of the water system to analyze the current condition and deficiencies that exist in the system. Then we discussed what would need to be done to complete repairs and upgrades to the system to prevent a future catastrophic failure. I will try to keep this summary in terms that would be easy to understand for someone who has no idea what it takes to deliver water to your home.

A basic overview of the existing equipment is as follows. There is a 12" diameter well located in the Rocky Bluffs subdivision that was drilled in the summer of 1972. The well was drilled to a depth of 629 feet. The well has a 50 horsepower submersible pump rated to deliver about 300 gallons per minute. The pump is hanging on 400 feet of 6" diameter steel pipe. The discharge line of the pump is connected to a common pipeline that is located in the Skansen Estates and Spanish Gardens subdivisions. That common pipeline terminates on one end at the top of the hill in Rocky Bluffs subdivision at two steel water storage tanks. One of the storage tanks holds about 67,000 gallons of water. It is the older of the two tanks. The second holding tank holds about 85,000 gallons of water. In one of the tanks is a float switch (switch inside a plastic ball). This switch is connected to the well pump control circuit by a hard wire that is in the ground running from the tank site to the well site. When the water level in the tanks gets low the switch turns the well pump on and when the tanks are full it turns the well pump off. Located at the water tank site is a building that has three above ground pumps that draw water from the tanks and pressurize the water into a separate pipeline that serves only the Rocky Bluffs Subdivision. The Skansen Estates and Spanish Gardens subdivisions, because of the lower elevation from the water tanks, receive water from the common pipeline that the well pump and water tanks are connected to. The Skansen Estates and Spanish Gardens subdivisions have 2-1/2" fire hydrants that are connected to the common pipeline. The Rocky Bluffs subdivision has 4-1/2" fire hydrants that are connected to the pipeline from the booster pump station. The pipelines through all the subdivisions are made out of ductile iron, pvc, and from what I have heard some transite.

The system was installed by the developer to meet State and County standards at the time that each phase of the subdivisions were built. It is standard practice that a developer will only install a basic water delivery system to meet current standards. After the water delivery system has been turned over to the homeowners and a community service district or mutual water company has been formed it is up to the water company to take it from that point and continue to maintain and improve the water delivery system. I have researched the installation of the water delivery system that serves the

Executive Summary

Skansen Estates, Spanish Gardens, and Rocky Bluffs subdivisions. I have found that the developer working with an engineering firm took all the proper steps and installed a water delivery system that met the current standards at the time each phase was installed. It is my conclusion that after the water company was formed it did a good job of keeping the system repaired but lacked the foresight to continue to build upon the basic water delivery system. Please keep in mind that the system was installed with good quality materials and has served the homes for 30+ years with very few problems. I feel that the previous board members did a very good job of keeping the homes in water for all these years and the homeowners enjoyed a very low cost for their water. It is not an easy task to operate a water delivery system and I commend the previous board members for keeping the system intact and operating for all these years.

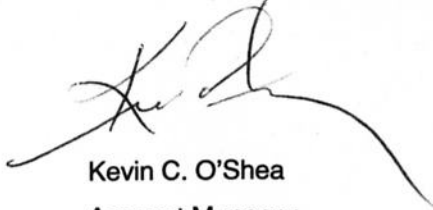
Times are changing and the state is stepping in. The clean water act has created more responsibility for water companies. The current board is aware of the responsibilities that they now have and also have a good understanding of the current condition of the water delivery system. Here are the most critical system deficiencies that we have determined.

- The existing well is 30+ years old and is nearing the end of it's expected normal service life
- The existing well pump has had new motors replaced but the pump itself is 15+ years old.
- The older 67,000 gallon water tank is leaking and is not repairable.
- The newer 85,000 gallon tank has not been inspected, cleaned, or repainted since it was installed. The exterior coating is chalking which indicates it is breaking down and exposing the undercoating. The tank does not have a lockable ladder gate on the tank ladder. The tank does not have an interior ladder.
- The system has only 1 well and when the pump fails the homes are out of water once the water storage tanks are empty.
- The 300 gallons per minute of water delivery of the existing well pump barely keeps up with the 24 hour period of water usage by the homes in the summer months. Last July the water level in the storage tanks was dipping below the fire reserve level and tripping the tanks low water level alarm every morning.
- The water delivery system has no backup power source.
- The fire hydrants in Skansen Estates and Spanish Gardens are 2-1/2". Standard 4-1/2" x 2-1/2" hydrants are recommended and each subdivision needs an additional hydrant installed.
- The water delivery system has no water meters. Water meters allow the water company to distribute the water delivery system costs based on actual water usage.
- The water delivery system has no sterilization equipment.
- The well site and tank site fencing needs to be upgraded for higher security.
- The booster pump building has storage shed grade doors. One door is broken.
- The well site and booster site should have landscaping to improve the appearance of the sites.

The current board has already addressed some immediate concerns. They have contracted Durham Pump to provide scheduled service and maintenance on the water system. It has been proven that scheduled maintenance saves money in the long run. Also they contracted Durham Pump to install a monitoring system so that we can keep a close watch on the water delivery system and try to prevent any catastrophic failure. The monitoring system also maintains data that will be

Executive Summary

valuable for the water company in the future. The main booster pump has a new variable speed drive which softens the start and stops of the pump as well as maximizes power consumption. Trees that were hanging over the old storage tank have been removed. The damaged pressure reducing valves that served Spanish Gardens have been replaced and the old main valve has been rebuilt to serve as a back up unit. The current board has the foresight to look ahead to the future of the water delivery system. The current board has done the research and has developed a plan of action to address the current system deficiencies and bring the water system up to a level of where it needs to be to meet the current and future demands of the system. Durham Pump would like to be the general contractor to assist the board to achieve its objective. We feel our knowledge of the water delivery system and close location of our company to the water delivery system provides the water company with an asset not available to many water companies.



Kevin C. O'Shea
Account Manager
Durham Pump Inc.

Objectives

- Solution:**
- Install a new well and pump system to be located at the water storage tank site.
 - Install a new water storage tank at the existing tank site to replace the failing tank. Remove the failing tank from the system once the new tank is online.
 - Install a minimum of one backup power generator at the water storage tank site to operate the new well pump and the existing booster pumps. Add a secondary generator at the existing well site.
 - Add monitoring system equipment to the new well pump and generators. Add monitoring equipment for chlorine monitoring and control.
 - Replace the existing 2-1/2" fire hydrants and install 2 new fire hydrants.
 - Add water meters to all the lot water connections.
 - Replace the residential grade fence fabric and add razor wire to the existing fencing

Objectives

at the existing well and water storage tank sites.

- Add chlorine injection equipment at the existing well site and the proposed new well site.
- Replace the storage shed grade doors on the booster pump building with higher grade doors.
- Landscape around the perimeter of the fence at the existing well site and water storage tank site.
- Replace the existing well pump after the new well pump system is online. Have the newer 85,000 gallon tank inspected, cleaned, and the exterior repainted. Have a lockable ladder gate installed on the tank ladder. Install a ladder on the interior of the tank. Recoat the interior of the tank within the next few years.

Objectives:

- By installing a new well and pump system the existing well pump system can be repaired and serviced while maintaining water to the homes. Also if one system fails there will be a backup system available to maintain water delivery to the homes. By installing the new well and pump system at the water storage tank site one backup power source will allow the capability to keep the complete water delivery system active to all the homes. Having a second water source will also increase the water production capability of the system to meet high demand periods.
- The failing tank needs to be replaced. Even with the addition of a new well the system needs additional storage to maintain a required fire protection reserve. The storage tanks also allow a buffer during peak demands and will allow the system to take advantage of reduced off peak power pricing from PG&E.
- The system has to have a backup power source in order to maintain water delivery to all the homes during a power outage. A second generator would allow both well pumps the capability to run if a power outage occurred during peak demand periods.
- Monitoring equipment allows the system to be monitored and controlled from offsite. Monitoring equipment is also a valuable tool for data recording and chlorine injection control. The existing monitoring equipment has replaced the hard wire connection for the existing well pump control.
- By replacing the existing 2-1/2" fire hydrants and adding 2 new hydrants the system can provide improved fire protection for all the homes. This will help to reduce fire insurance costs and increase the property values of all the homes that are currently served by the 2-1/2" hydrants.
- Adding water meters will allow the water company to distribute the cost of the water delivery system to the homes that use the most water. Water meters also remind people to conserve the resource. With the water meter installations there would also be a lockable valve installed to allow the water company to terminate the water service to homeowners that will not pay their water bill.
- After 911 the government has asked that all water companies increase the security of their water systems. The board has seen signs that intruders have been at the holding tank site. By upgrading the fencing around the sites it will detour unwanted entry into the sites. One could imagine the results of a contaminant being

Objectives

introduced into the water storage tanks. Also there is the lesser concern of property damage and liability.

- Water quality and safety is not only prudent it is the law. If one occurrence of bacteria is found in the water delivery system the system would need to be sterilized. By adding chlorine injection equipment to the system the water company will be able to quickly respond to a bacterial contamination. The water company is now being required to sample water in several locations within the water delivery system. It is not uncommon to have water clear of bacteria coming from the well and yet find bacteria in the pipelines. I foresee that like other larger water companies Gran Mutual may have to chlorinate the water at all times to insure safe water delivery to the homes.
- The booster pump building doors are storage shed grade doors. With increased attention being placed on the pumping equipment the doors need to be replaced with a grade of door designed for increased usage. One of the doors is already in need of repair.
- By landscaping around the equipment sites it will improve the visual quality for the homeowners that boarder the sites. It will also improve the value of all the homes.
- The existing well pump is 15+ years old. Average life of a pump in the quality and usage range of the existing pump is 10 years. The existing drop pipe check valve has failed and allows the water to drain from the drop pipe when the pump shuts off. It is a critical problem but in order to replace the pump the homeowners would be out of water.
- The existing 85,000 gallon water storage tanks needs to be cleaned and inspected to determine if there are any intrusions to the interior tank coating. Once the interior tank coating has broken down the water attacks the steel and the tank will immediately start to corrode. The result is the tank will rust through and start leaking just as the 67,000 gallon tank has done. If a break in the interior coating can be detected early before the steel is too badly corroded the interior coating can be repaired. The bottom steel plate of the tank is the most vulnerable. In order to properly inspect the interior coating on the bottom of the tank the silt needs to be cleaned out of the tank. It is recommended that the interior of the tank be recoated every 7 years. The exterior coating of the tank is chalking and starting to expose the undercoating. This leaves the undercoating exposed to UV rays. Once the undercoating breaks down the steel will be exposed to the elements. It is recommended the exterior of the tank be repainted every 10 years. The ladder cage on the tank does not have a lockable ladder gate. This leaves the tank vulnerable to unwanted access to the tank hatch at the top of the tank. Also again is the lesser concern of property damage and liability. The tank does not have an interior ladder. This is an OSHA requirement for the capability to properly maintain the tank. The overflow pipe needs to have a screen installed to prevent rodents and insects from entering the tank.