# La Mesa Water Coop
# Water Supply Plan

*12-1-2011*

*By F. West and M. Davis*

## I. ASSUMPTIONS (Ref: 2008 study)

- 60% run time for well pumps
- Add two new users per year
- Peak demand: 380 gal./day/user
- Well flows & life:
    - Well #5 – 106 GPM, 27 years remaining
    - Well #1 – 33 GPM, 7 years remaining (may change)
    - Well #3 – 62 GPM, out of service
    - Well #2 – 20 GPM, 2 years remaining (may change)

The above assumptions are less conservative than the 2008 study. See attached worksheet.

## II. CONCLUSION

Need another source of water by 2013 – same result as 2009 study.

Options remain the same: Treat #3 or drill new well.

New well cheaper due to lower operating costs.

New well locations are: Park site or well #1 site.

Well #2's life may be short.

Well #1 may not be usable if new well is drilled on site.

Well #5's life may be shortened if new well is at park site.

# III. RECOMMENDATION

Drill new well at well #1 site (existing easement) for the following reasons:

- Better geology than park site; see attached analysis by F. West.
- Do not want to shorten life or flow of well #5 by adding a close well.
- Existing three phase power and well house.
- Well #1 has a shortened life and is the oldest well.
- Lower cost than other sites.

New well at well #1 site (draft)

- Flow at 60 GPM
- Deeper than existing well by ~ 200'.
- Same design as well #5.
- May or may not be able to keep existing well #1 in service; to be determined during testing of new well.

Note: Another source of water is needed in approximately 10 years.

## Assumptions

| | | |
|---|---|---|
| Wells decline: | 2% | per year |
| Peak demand: | 380 | g/day/house |
| Additional houses: | 2 | per year |
| Pumping duty cycle | 60% | |
| Well 6 initial capacity | 60 | GPM |

| | | | Well #1 | Well #6 at well #1 site | Well #2 | Well #3 @50 GPM | Well #5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Well life left (years):** | | **7** | **30** | **2** | **10** | **27** | | | |
| **Year** | **# houses** | **Peak demand KG/day** | **GPM** | **GPM** | **GPM** | **GPM** | **GPM** | **Water available GPM** | **Water needed @ 60% GPM** | **$ Needed** |
| 2011 | 321 | 121,980 | 33 | | 21 | | 106 | 160 | 141 | |
| 2012 | 323 | 122,740 | 32 | | 21 | | 104 | 157 | 142 | |
| 2013 | 325 | 123,500 | off | 60 | off | | 102 | 162 | 143 | $250K |
| 2014 | 327 | 124,260 | | 59 | | | 100 | 159 | 144 | |
| 2015 | 329 | 125,020 | | 58 | | | 98 | 155 | 145 | |
| 2016 | 331 | 125,780 | | 56 | | | 96 | 152 | 146 | |
| 2017 | 333 | 126,540 | | 55 | | | 94 | 149 | 146 | |
| 2018 | 335 | 127,300 | | 54 | | | 99 | 153 | 147 | |
| 2019 | 337 | 128,060 | | 53 | | | 97 | 150 | 148 | |
| 2020 | 339 | 128,820 | | 52 | | | 95 | 147 | 149 | |
| 2021 | 341 | 129,580 | | 51 | | 50 | 93 | 194 | 150 | $350K |
| 2022 | 343 | 130,340 | | 50 | | 49 | 91 | 190 | 151 | |
| 2023 | 345 | 131,100 | | 54 | | 48 | 89 | 192 | 152 | |
| 2024 | 347 | 131,860 | | 53 | | 47 | 88 | 188 | 153 | |
| 2025 | 349 | 132,620 | | 52 | | 46 | 86 | 184 | 153 | |
| 2026 | 351 | 133,380 | | 51 | | 45 | 84 | 180 | 154 | |
| 2027 | 353 | 134,140 | | 50 | | 44 | 83 | 177 | 155 | |
| 2028 | 355 | 134,900 | | 49 | | 43 | 81 | 173 | 156 | |
| 2029 | 357 | 135,660 | | 48 | | 43 | 89 | 179 | 157 | |
| 2030 | 359 | 136,420 | | 47 | | 42 | 87 | 176 | 158 | |
| 2031 | 361 | 137,180 | | 46 | | 41 | 85 | 172 | 159 | |

clean

**Notes:** - 2021 water source: treat well #3 @ 50 or 75 GPM, or drill new well
- Peak demand is "driving" water demand
- Need another source by 2034

LMWC - WELL #1

Well #1 was drilled in 1989 about 800 feet east of the East Valley View fault to a depth of 689.5 feet, encountering water at 305 feet and "redrock" at 365 feet. The hole was cased with 6 5/8" steel pipe with the bottom 310 feet being a slotted (35-50) screen. The well was pumped at 80 gpm.

Dr John Shomaker estimated (9/23/2003) the aquifer transmissivity, based on a short 70 gpm pumping test (9/23/2000), to be about 900gpd/ft and a specific capacity of 1.83 gpm/ft-dd. John also noted that the water level decline of 4.1 ft/y is about what the Los Ranchos wells 2 and 3 experienced during the 1989 –2000 period.

Since 2000 several more specific capacities have been determined which indicate well #1 is becoming less efficient. Certainly the well became less efficient and specific capacity decreased when 4" plastic liner was placed in the well due to the deteriorating condition of the casing. The most recent (10/29/2010)specific capacity value is 0.67 gpm/ft-dd at a pumping rate of 33.6 gpm during a test. Although the 2010 test was a relatively short test, when plotted on log-log paper it matched the Theis type curve, but at an earlier time than one would expect for a 22-year old well.

Although the 10/29/2010 test of well #1 was ostensibly intended as a test of just that well it also reflects all of the hydrologic events that occurred before the well was drilled and all of those since the well was drilled. Most of these effects are too small to measure but they are there. The most important effects would be the effects of other wells in the area which would cause the water level decline to increase and recharge from surface water, mainly in arroyos which would cause water levels to rise. These recent events update the timing of the Theis type curve. So the dewatering of the aquifer aerialy appears to be occurring uniformly in a Theisian fashion which is the most efficient usage of the resource. Dr Theis, known as the father of modern groundwater hydrology and who worked for many years in the Albuquerque office of the USGS, would like that!

If a new well were to be drilled at the well #1 site two things should be considered. Since well #1 did not fully penetrate the aquifer it theoretically does not produce what a fully penetrating well would. So a deeper well at this site should produce more since it would have a better connection to the aquifer. This improved connection would tend to offset increased water level declines related to increased production. Also a new well should have a more hydraulically efficient screen, such as well #5 has to reduce head losses related to water passing through the screen which result in increased production.

A deeper well would have a risk of finding higher arsenic water which ordinarily could be handled by plugging back.

F. WEST
2010

**XFINITY Connect** lamesawatercoop@comcast.ne

± Font Size -

# Well 6

**From :** AFGwest@comcast.net Mon, Nov 28, 2011 04:41 PM

**Subject :** Well 6

**To :** Marty <lamesawatercoop@comcast.net>

**Cc :** afgwest@comcast.net

Visited Well 1 and looked at more maps. Well 1 is east of the fault that is on the east side of well 5 that makes it in the same fault block as the proposed site at the junction of Cienega and Cacto. Well 1 site appears to have less fracturing than Well 4. The Ranchos fault is about half a mile east of Well 1. The geology map indicates that as one goes east the material becomes coarser. On this basis well 1 is a better site than well 5.
Since well 1 is the oldest and in the worst shape of well 1 and 5. So this and being a better site, well 1 would be the best site to redrill.

geo map @ http://geoinfo.nmt.edu/publications/maps/geologic/ofqm/dowloads/2/Bernalillo_and_Placitas_36in_Plate1.pdf