



Montebello Vista Park

- ❖ Irrigation System Observations
- ❖ Review of Water Use
- ❖ Estimated Water Budget
- ❖ Potential for Savings

Site Visit: January 18, 2008

Address: Montebello and Capistrano Drives, Suisun City

Key Action Items

Tune Up Sprinklers

Replace Leaking and Damaged Spray Sprinklers. Adjust Sprinkler Arc, Radius and Tilt to Improve Performance at Low Cost.

Re-nozzle Rotor Sprinklers

See text for specifics.

Modify Irrigation Schedules

Reduce Runtimes, Split Total Runtime into Multiple Cycles (aka "Cycle and Soak") to improve Infiltration of Irrigation Water. Track weather changes and modify schedules accordingly.

**Estimated
Potential Savings
\$4,300 per year**

Introduction

A Landscape Water Management Survey was performed at this site including:

- Irrigation System Observations and Testing
- Review of Irrigation Water Use
- Estimated Water Budget and Potential for Savings

We found the performance of the irrigation system to be a bit below average, but a number of broken sprinkler heads have been wasting large amounts of water (actually visible in an aerial photo), perhaps for years. Deferred Maintenance and Poor Scheduling are reducing irrigation efficiency, resulting in water waste, possible damage to pavement and high bills.

Significant irrigation cost savings and improved appearance are possible if this system functioned up to potential.

Please do not hesitate to call if we can answer any questions for you.

Sincerely,

Gary Kah

Gary Kah (650-799-4909)

Detailed Action Items

1. Low Point of Connection (POC) static pressure -- 59 PSI instead of the estimated 85 PSI required -- is a critical factor reducing sprinkler uniformity for the large turf rotors.
2. Nozzle selection for large turf rotor sprinklers is critical. With this site's average Head-to-Head spacing of 42 feet, the suggested nozzle for Hunter I-40 heads would be #41 or 42. Mixed sprinkler types -- PGP, I-25 and I-40's on the same valve -- pose additional challenges for nozzle selection and radius.
3. The range adjustment screw (nozzle retention screw) of large rotor sprinklers should not be used to split the water stream of the main nozzle except for a few sprinklers close to the edge of irrigated areas where range reduction is required.
4. Use 360* rotor sprinklers in center field areas and use adjustable arc models only along edges.
5. Repair broken popup shrub and turf spray sprinklers particularly in the area northwest of the northern baseball diamond.
6. Ensure all sprinklers are at grade to avoid interception of spray by turf.
7. Reduce pressure in popup spray stations from the too-high 50 psi to 30 psi.
8. Adjust alignment of all edge sprinklers, either by twisting the sprinkler body, adjusting the Arc Screw for rotors or replacing the fixed arc nozzle in a spray head (with either an appropriate fixed arc nozzle or an adjustable arc nozzle).
9. Clear clogged nozzles and replace damaged nozzles on spray sprinklers.
10. Track down "duplicated station" wiring which is causing multiple firing of some valves.
11. Rewire the sequence of "two valve" stations across all controllers so that they are not physically next to each other along the mainline to reduce pressure losses.
12. Trim back excessive runtimes on spray and rotor sprinklers for both turf and shrub stations and use multiple cycle starts to split up all runtimes.
13. Create laminated station maps and station listings to place in the controller boxes and print up "normal" schedules for Spring, Summer and Fall.
14. Use a radio remote to facilitate system checks and repairs.

Irrigated Area

The irrigated area measurements used in this analysis are based on an aerial photograph.



<i>Irrigated Area</i>	<i>Square Feet</i>	<i>Acres</i>
<i>Ornamental Turf</i>	226,000	5.19
<i>Gound Cover/Shrub</i>	8,000	.18
TOTAL	234,000	5.37

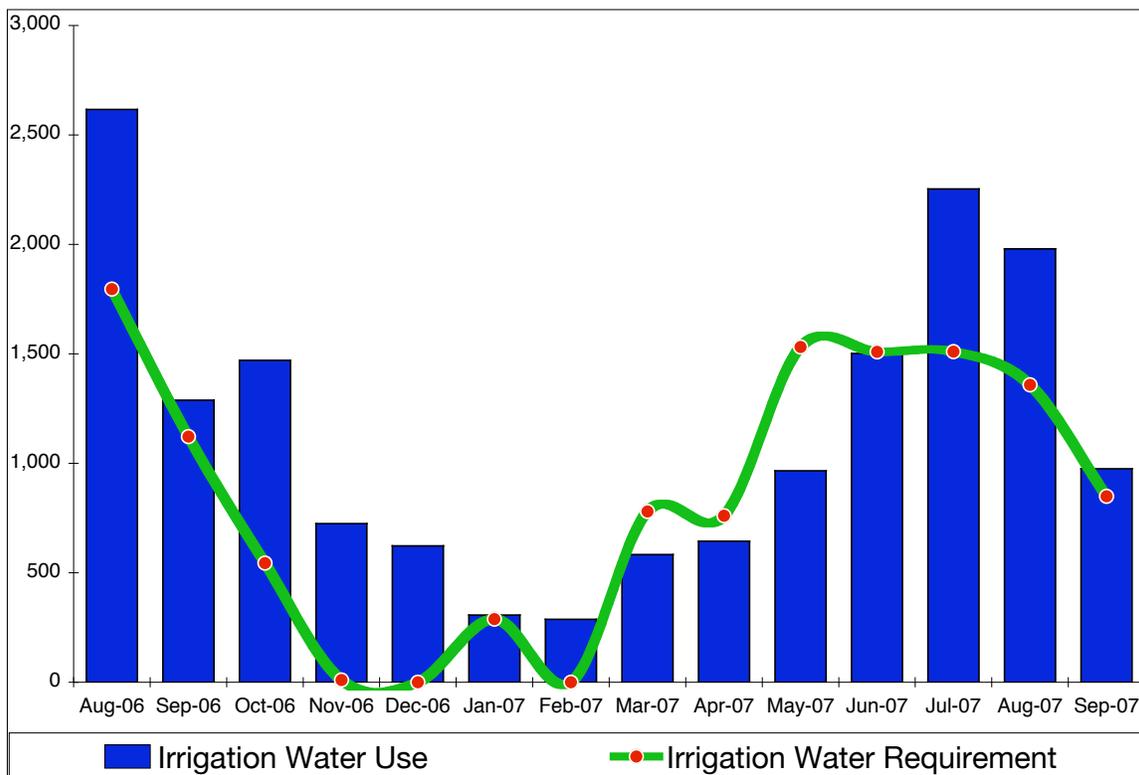
Data Source: Aerial photographs

Water Consumption

Water use data was tabulated for 14 months for the single irrigation meter at the site.

Month	Water Use	Target	Savings
<i>Aug 2006</i>	2,616	1,796	\$820
<i>Sep 2006</i>	1,289	1,122	\$170
<i>Oct 2006</i>	1,471	544	\$930
<i>Nov 2006</i>	724	10	\$710
<i>Dec 2006</i>	623	0	\$620
<i>Jan 2007</i>	307	288	\$20
<i>Feb 2007</i>	287	0	\$290
<i>Mar 2007</i>	583	780	\$0
<i>Apr 2007</i>	644	761	\$0
<i>May 2007</i>	966	1,531	\$0
<i>Jun 2007</i>	1,502	1,509	\$0
<i>Jul 2007</i>	2,253	1,510	\$740
<i>Aug 2007</i>	1,980	1,359	\$620
<i>Sep 2007</i>	975	849	\$130
Total for Period	16,220	12,059	\$5,050
Estimated Annual Savings			\$4,300

Potential annual savings are approximately \$4,300 per year, assuming the irrigation system is maintained and scheduled to operate more efficiently.



Observations

Sprinkler Condition Analysis	
Total number of sprinkler heads observed	94
Number of Effective Sprinklers	34
Percent Effective	36%
Target Percent Effective	80%

Corrective Actions		As % of Sprinklers At Site
Replacement \$\$\$	Remove and replace with operating sprinkler (often requires excavation).	11%
Alignment \$\$	Ensure sprinkler is vertical and at grade (requires excavation in many cases).	25%
Tune \$	Adjust radius and arc to deliver water into desired area. May require re-nozzling.	29%

Field Tests and Irrigation System Performance

A Field Test was performed on representative stations and the results are presented below.

Con-troller	Station(s)	Sprinkler Type	Test Method	Precipitation Rate (inches/hour)	Distribution Uniformity (Lower Quarter)
A	3	Rotor	Catch Can	0.41	62%

The precipitation rate and distribution uniformity (lower than desired) in the turf rotor stations were adversely affected by low pressures (achievable DU = 70-75%). In the spray station, leaks prevented effective testing.

Irrigation Schedules

Due to poor sprinkler condition, provision of irrigation schedules is not possible at this time.

Pending sprinkler replacement, alignment and tuning at this site, sample schedules could be provided and would include all information needed to program electronic controllers for each month, including:

- Minutes per cycle for each station
- Number of days per week to irrigate
- Number of cycles (in other words, start-times) to set for each irrigation day

Irrigation Scheduling Guidelines

- Use Controller Features such as multiple start times (to reduce sprinkler runoff) and Multiple Programs (to vary frequency of irrigation to match rootzone depth and plant type).
- “Trim Back” station runtimes periodically if there are no dry areas. Plan controller start times so that the last sprinkler station finishes irrigating just before dawn.
- Irrigate the areas most sensitive to wind (e.g., sprinkler stations along edges or hard-scape) last, i.e., pre-dawn hours.
- Try new schedules on a test area as a REALITY CHECK before implementing site-wide.

Appendix / Photo Gallery

This gallery illustrates the problems encountered at this site.



Problem: Critically low mains pressure can cause poor uniformity and low precipitation rates.

Solution: Note suggestions for re-nozzling rotor sprinklers.



Problem: Note brown patches shown in this aerial in the turf due to low pressure and nozzle selections.

Solutions: See captions for the following photographs.



Problem: Note the differences in the size of the main nozzle stream in the two photos on this page.

Solution: Ensure Hunter PGP I-25 and I-40 rotor sprinklers have balanced nozzles.



Problem: Nozzle size varied through the site.

Solution: See explanation above.



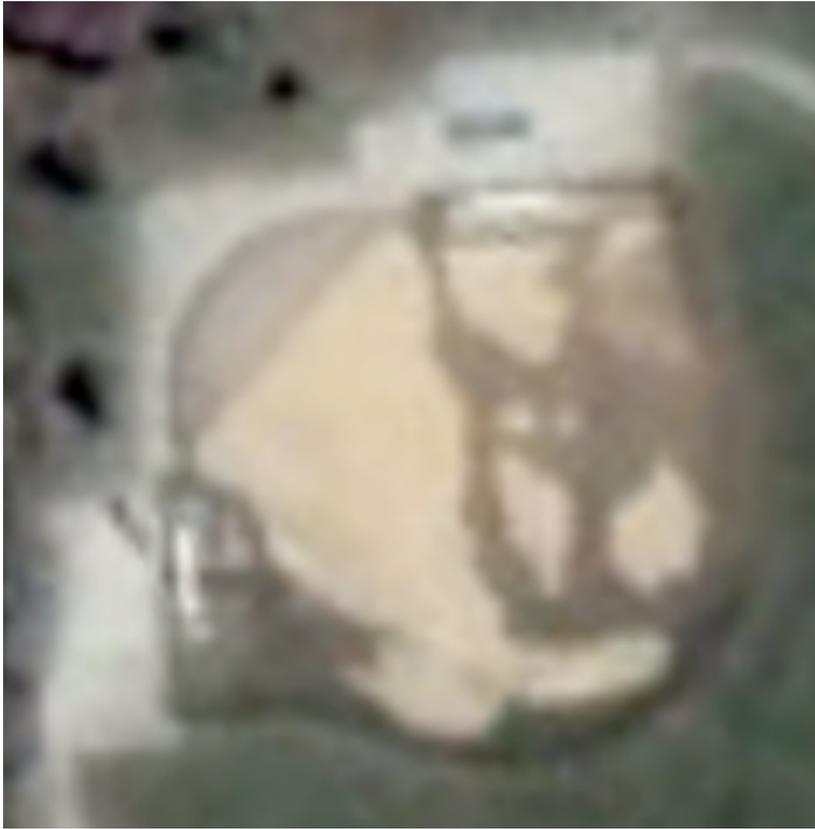
Problem: Rotor sprinkler set too low in the turf causes accumulation of water around the head. This creates soft soil which can further destabilize the head. In addition the nozzle retention screw is splitting the main stream of water.

Solution: Raise the sprinkler to grade which allows spray to clear surrounding turf. Set the retention screw to barely touch the water stream.



Problem: Even with damaged sprinkler this station still has excessive pressure.

Solution: Reduce pressure to 30 psi (using a pressure gauge and the flow control stem at the valve) and repair all damaged sprinklers.



Problem: Detail of aerial photo showing leaking sprinklers flooding baseball diamond.

Solution: Repair leaks.



Problem: Ground level view of the leaks depicted above.

Solution: Note above.