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moulton niguel water district

Pressure Reduction Pilot Study

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Moulton Niguel Water District

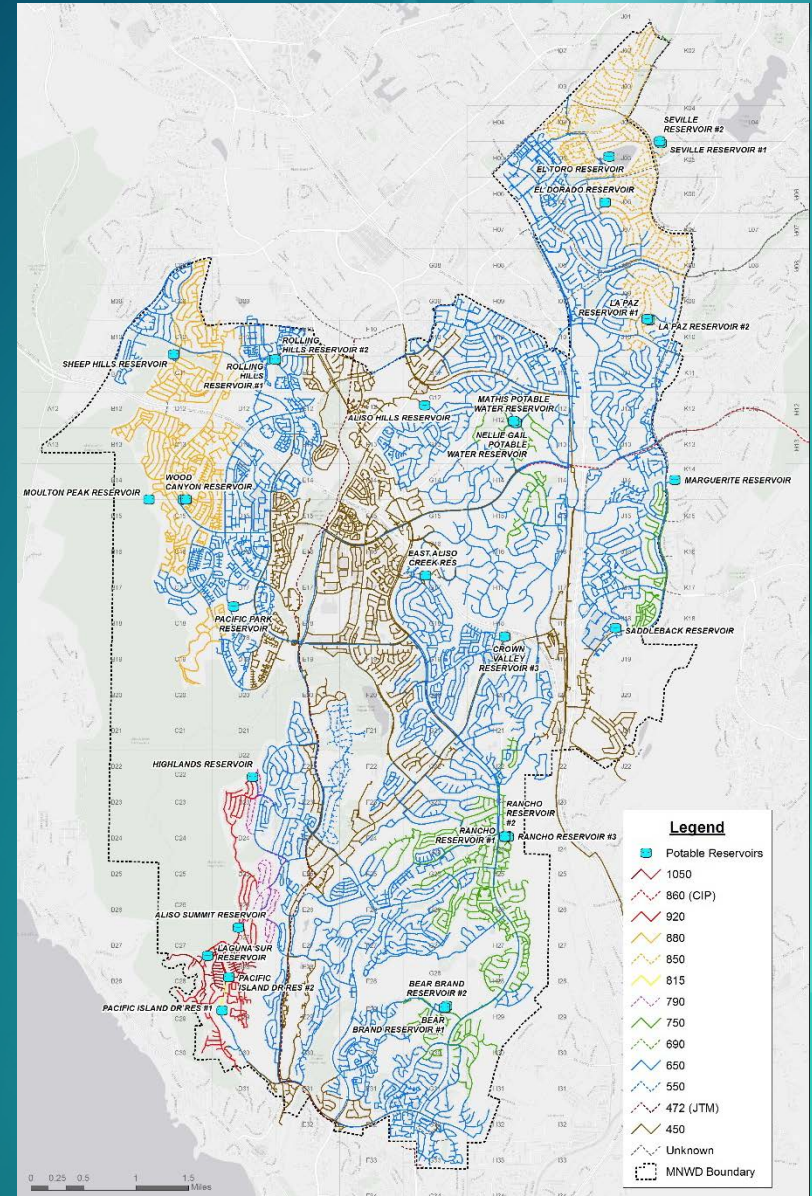
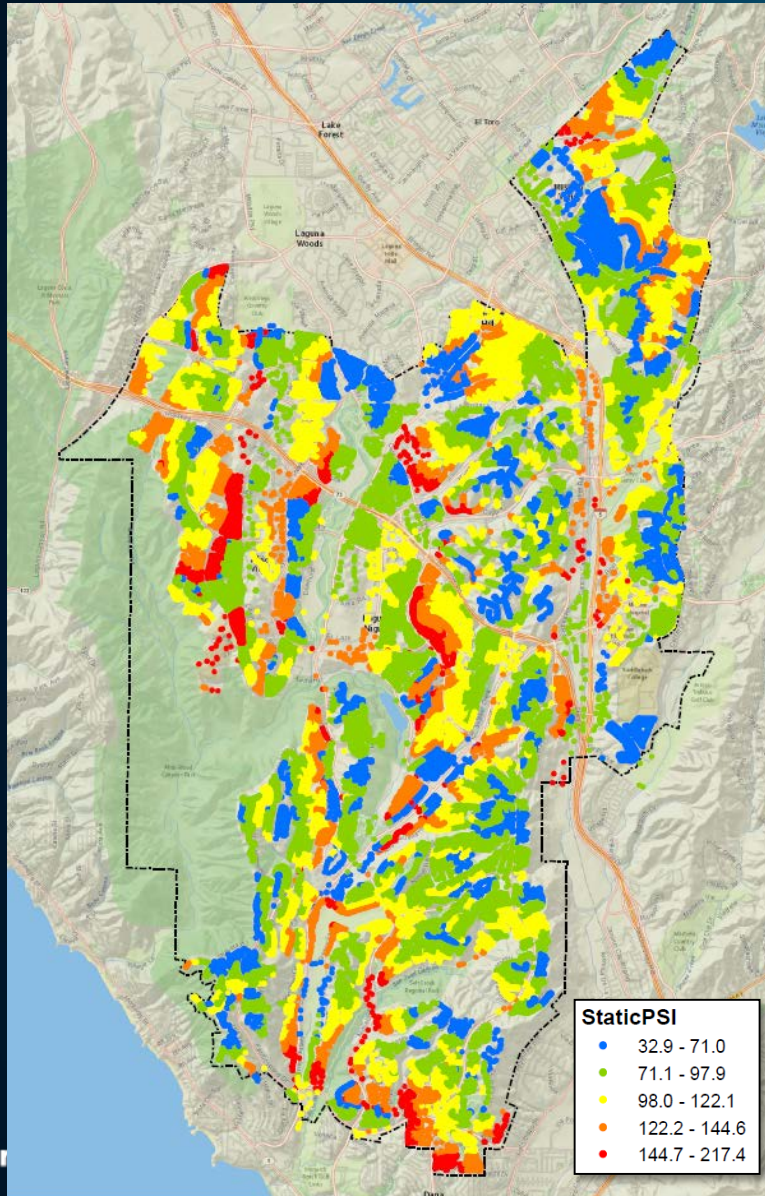
- Water, recycled water & wastewater services to (approximately) 170,000 people
- Formed in 1960
- 7-member Board of Directors
- 28 Potable water reservoirs
- 12 Recycled water reservoirs
- 700 miles of potable water pipelines
- 148 miles of recycled water pipelines
- 537 miles of sewer pipelines
- 14 billion gallons average annual demand

Serving five south Orange County cities:

1. Aliso Viejo
2. Dana Point
3. Laguna Hills
4. Laguna Niguel
5. Mission Viejo



Static Pressure and High Pressure Zones



Sprinkler System

3 areas to focus on:

- Water the Right Place
- Water Evenly
- Proper Scheduling



Measured Approach

- Using market research for program development
 - UCR Study
 - Focus on outdoor pilots and programs
- Iterative, adaptive approach
 - Focus on pilots
 - Proof of Concept/Effectiveness
 - Responsible with Public Funds



Pressure Reduction Pilot Study

- Does excessive water pressure lead to reduced efficiency in residential outdoor watering?
- How much water is lost to misting?
- What effect does excessive pressure have on irrigation efficiency at residential sites?
- Can a program targeting pressure management achieve significant gains in irrigation efficiency?



Pilot Design

- Pre-Screening
- Pre-Installation Evaluation
- Pressure Regulation Installation
- Post-Installation Evaluation



Participant Identification & Pre-Screening

- Target high pressure zones
- Visual inspection of yard
- Configuration of existing irrigation system
- Types of sprinklers in use
- Targeted single family residential customers
- Landscape between 500-1500 square feet of front yard turf
- Must have automatic sprinkler timer
- Must have working house regulator
- Irrigation POC must be free of corrosion
- Tested pressure at two sprinklers per lawn valve
- 6 out of 10 customers did not pass pre-screening



Evaluation Metrics

- Pre and Post Evaluation examined:
 - System and station pressures
 - Distribution uniformity
 - Irrigation system application rate
 - Meter flow rate
- Techniques:
 - System/station pressure test with pressure gauge
 - Catch-can test
 - Record water usage and application rate per valve by using meter readings at beginning and end of 5 minute run time.
 - Record meter start and stop reads
- Note: Irrigation timer settings were not changed



Pilot Summary

- Advertising consisted of cold calling 26 customers
- 10 customers agreed to participate
- 4 customers received an installation
- The pilot program ran for approximately 3 months
- Average size landscape: 850 sq ft



Customer Participation Agreement

Customer Participation Agreement Moulton Niguel Water District Pressure Reduction Pilot Program

The Pilot Pressure Reduction Program ("Pilot" or "Program") is being offered by the Moulton Niguel Water District ("District" or "Agency") to test the effectiveness of pressure regulators on irrigation and water use efficiency. The Pilot is available to customers with single family residential homes and aims to assess the efficacy of pressure regulators at various pressure zones throughout the District. Participating customers ("Customer(s)") will receive a pre-qualifying assessment to determine eligibility. Customers who successfully pass the pre-qualifying assessment will receive: (i) a pre-installation evaluation, (ii) installation of a single pressure regulator on the irrigation manifold supply point of connection ("POC"), and (iii) a post-installation irrigation efficiency evaluation. The pre-qualifying assessment, pre-installation evaluation, pressure regulator installation, and post-installation evaluation, may be conducted on two different days. These services will be performed by a licensed plumber employed by the District ("District Employee"). It is anticipated that this Program will help reduce overall irrigation water use, increase irrigation efficiency, and create less wear and tear on the irrigation components overall; thereby, increasing the life of the valves, fittings, and nozzles.

Program Eligibility Requirements

Applicants are required to meet these criteria

1. Customer must have an irrigation system in Customer's landscape, which is operating with an automatic irrigation controller.
2. Customer must have 500-1,500 square feet of turf in Customer's landscape.
3. Customer must not have an existing pressure regulator installed in Customer's irrigation supply POC.
4. Customer acknowledges that work will only be performed on front yard turf.
5. Program eligibility is contingent upon passing a pre-qualifying assessment, which consists of verifying the irrigation system is free of leaks or breaks, and is in good working condition.
6. Program eligibility is contingent upon Customer making repairs to any breaks or leaks identified during the pre-qualifying assessment. Said repairs must be made within 7 days of the date of the pre-qualifying assessment in order to continue in the Program. District staff maintains discretion to determine whether Customer's irrigation system POC configuration qualifies for the pressure regulator installation.
7. Customer must be present at the service address for the entire process of completing the pre-qualifying assessment, pre-installation evaluation, pressure regulator installation, and post-installation evaluation. All work will be completed during business hours (i.e. 8 am – 5 pm, Monday – Friday). Customer should allow a minimum of 4 hours for the entire process.
8. Customer shall provide the District and the District Employee with the right of escorted ingress and egress to and from Customer's property and access, and any other applicable rights-of-way, on or about Customer's property which the District determines, in its discretion, to be necessary



Pressure Regulator Installation

- Performed by licensed Plumbing Contractor
- Set pressure regulator to 40-45 PSI



Irrigation System Audit

Site 1



Pre-Inspection Site 1		Post-Inspection Site 1	
Flow Rate (gpm)	11	Flow Rate (gpm)	7
Working Pressure (psi)	80	Working Pressure (psi)	40
Minutes Until Run Off	2	Minutes Until Run Off	3
DU _{LQ}	53%	DU _{LQ}	40%
Avg. Precip Rate (in/hr)	1.58	Avg. Precip Rate	1.15
Approximately 800 sq ft Front Yard Turf Area			



Irrigation System Audit

Site 2



Pre-Inspection Site 2		Post-Inspection Site 2	
Flow Rate (gpm)	21	Flow Rate (gpm)	15
Working Pressure (psi)	90	Working Pressure (psi)	40
Minutes Until Run Off	3	Minutes Until Run Off	3
DU _{LQ}	39%	DU _{LQ}	54%
Avg. Precip Rate (in/hr)	1.80	Avg. Precip Rate	1.41
Approximately 1,200 sq ft Front Yard Turf Area			

Irrigation System Audit

Site 3

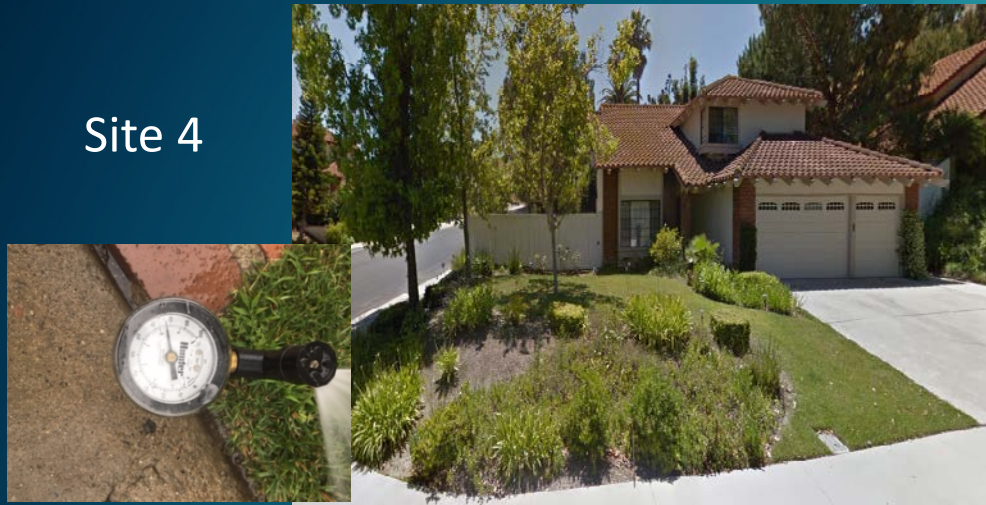


Pre-Inspection Site 3		Post-Inspection Site 3	
Flow Rate (gpm)	12	Flow Rate (gpm)	7
Working Pressure (psi)	88	Working Pressure (psi)	45
Minutes Until Run Off	2	Minutes Until Run Off	3
DU _{LQ}	55%	DU _{LQ}	47%
Avg. Precip Rate (in/hr)	2.02	Avg. Precip Rate	1.49
Approximately 600 sq ft Front Yard Turf Area			



Irrigation System Audit

Site 4



Pre-Inspection Site 4		Post-Inspection Site 4	
Flow Rate (gpm)	11	Flow Rate (gpm)	8
Working Pressure (psi)	76	Working Pressure (psi)	41
Minutes Until Run Off	2	Minutes Until Run Off	3
DU _{LQ}	48%	DU _{LQ}	40%
Avg. Precip Rate (in/hr)	1.93	Avg. Precip Rate	1.38
Approximately 600 sq ft Front Yard Turf Area			



But...Several Issues

Number of site visits required to acquire one qualifying participant

Number of successful outcomes

Major issues the pilot study encountered

Irrigation systems designed based on street pressure (adaptive/creative irrigation design)

Poorly designed irrigation systems (low pressure at heads to begin with)

- Mixed heads/manufacturers/flow rates

- 30+ heads on one valve

Poorly maintained systems

Homeowner ignorance (think their landscaper will take care of it)

Irrigation manifold configuration not conducive to pressure regulator and irrigation isolation valve installation



Pilot Takeaways

Did we answer our question?

What to do with these pilot results?

- Scale it up?

- Design a new program? A more flexible program?

 - Put in pressure regulating bodies instead of regulator

 - Inline pressure regulator

 - Irrigation system tune-up



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